

MARINE REVIEW.

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No. 6.

Correct Figures on Coal and Ore Shipments.

Shipments of soft coal to Lake Superior ports on Aug. 1, 1893, were practically 1,000,000 tons greater than they are at present, while the shipments of iron ore from Lake Superior ports to Aug. 1 of this year are in round numbers 1,150,000 tons greater than they were on Aug. 1 a year ago. Thus it will be seen that the opinion generally expressed regarding heavy coal shipments and only a moderate movement of ore for the balance of the season is borne out by statistics. Iron ore shipments from all Lake Superior ports to Aug. 1, 1894, as indicated by the summary of St. Mary's Falls canal reports that appear below, aggregated 3,077,623 net tons, against 1,927,793 net tons on the same date a year ago. Escanaba shipments are known to be less than 1,000,000 gross tons, and if to this total of 3,077,623 net tons of ore shipped from Lake Superior there is added an estimate of 1,000,000 net tons as the amount thus far forwarded from Escanaba, we have a grand total in ore shipments from all ports of about 4,050,000 net or 3,650,000 gross tons, with the three full months of August, September and October, and a part of November, for further shipments.

In the soft coal trade, however, the situation is different. July shipments of hard and soft coal through the canal amounted to only 285,202 tons, against 618,021 tons, during the same month last year. In last year's statement the figures as to hard and soft coal are inseparable, but the aggregate was 1,501,210 tons. As the hard coal shipments this year, which amounted to 245,882 tons on Aug. 1, are about equal to those of a year ago, it follows that on Aug. 1 a year ago the soft coal shipments amounted to about 1,255,000 tons, against 285,000 tons on the same date this year. A full statement of the St. Mary's Falls canal traffic to Aug. 1 follows:

EAST BOUND.

ITEMS.	Designation.	To Aug. 1, season of 1893.	To Aug. 1, season of 1894.
Copper.....	Net tons.....	42,352	44,351
Corn.....	Bushels	1,299,343	1,222,246
Building stone.....	Net tons.....	11,520	12,401
Flour.....	Barrels.....	2,753,769	3,360,410
Iron ore.....	Net tons.....	1,927,793	3,077,623
Iron, pig.....	Net tons.....	9,308	10,421
Lumber.....	M. ft. B. M.....	244,358	325,966
Silver ore.....	Net tons	835	372
Wheat.....	Bushels.....	21,651,133	10,832,506
Unclassified freight.....	Net tons.....	54,669	57,937
Passengers.....	Number.....	4,024	6,208

WEST BOUND.

Coal, anthracite.....	Net tons.....	1,501,210	245,882
Coal, bituminous.....	Net tons.....	286,785	
Flour.....	Barrels.....	500	753
Grain	Bushels	300	500
Manufactured iron.....	Net tons.....	30,793	10,034
Salt.....	Barrels.....	91,442	80,699
Unclassified freight.....	Net tons.....	120,108	106,269
Passengers.....	Number.....	4,783	6,468

*Anthracite and bituminous were not separated in 1893.

Following are some other interesting items taken from the canal report for July:

Vessel passages	2,084
Registered tonnage, net	1,728,904
Freight tonnage, net	1,637,618
Passengers.....	7,249
Lockages.....	961

Aggregate time consumed by vessels in passing, 1,068 hours and 15 minutes.

The business of the canal during the past month is compared with that of July, 1893, in the following table:

	July, 1893.	July, 1894.
Vessel passages.....	2,078	2,084
Registered tons, net.....	1,675,275	1,728,904
Freight tonnage, net.....	2,017,183	1,637,618
Passengers.....	5,351	7,249

Thus there is an increase of six in the number of passages and an increase of 53,629 net tons in the tonnage of vessels, while the number of passengers is 1,898 in excess of July of last year. The decrease of 379,565

net tons in freight tonnage is due entirely to the light shipments of soft coal during the month.

	To Aug. 1, 1893.	To Aug. 1, 1894.
East bound freight, net tons.....	3,418,328	4,434,188
West bound freight, net tons.....	1,694,850	561,845
Total freight, net tons.....	5,113,178	4,996,033

Hay Lake Channel in General Use.

Probably a majority of vessel masters trading to Lake Superior have already secured the services of a pilot for the first trip through the Hay lake channel and are now running the new channel, both with and without cargoes. Those who have not as yet gone over the new route will, of course, acquaint themselves with it as soon as possible, as a marked lack of progress would be shown in not doing so, and within another week or two the entire Lake Superior fleet will be taking advantage of the improvement.

Capt. Symes of the Cleveland-Cliffs Iron Company's steamer Cadillac, who locked through the canal bound down about 5 o'clock Sunday evening, took the Hay lake channel and passed through the river by daylight, thus saving a full day by being out on Lake Huron by night. It is in this regard that the new channel is especially advantageous. The Cadillac was probably the first boat to run the channel loaded, as she came down that way on a previous trip. Capt. Symes says he has met with some of the largest freight boats bound up and down and has found no difficulty in passing. Hay lake pilots have been very numerous at the Sault of late, many captains of tugs quitting their work for the new employment, but the older pilots have of course been engaged in most cases. Last Saturday Capt. Campau took the North West through the channel without a pilot.

Soft Coal in Ohio and Pennsylvania.

Official reports regarding the coal industry in both Ohio and Pennsylvania have just been issued. The production of bituminous coal in Pennsylvania in 1893 was 43,421,898 tons, as compared with 46,576,576 tons produced last year. As usual, the Pittsburg district leads in production, Westmoreland county is first with 7,583,346 tons. Allegheny comes next, with a production of 6,894,510 tons. The production of Clearfield and Fayette counties is nearly the same, the former producing 6,081,324 tons, while Fayette produced 6,105,843 tons. Washington produced 3,414,444 tons; Cambria, 3,377,489; Jefferson, 3,072,297; Centre, 1,259,831. The production of the other counties falls considerably below those figures.

The year's production of coal in Ohio is given as 14,828,097 tons, an amount never before equaled in the state's history. The gain in lump coal amounts to 253,343 tons. In nut coal there is an increase 54,180 tons, while in pea and slack there appears a decrease of 79,334 tons. The total increase as compared with the year 1892 is shown to be 228,189 tons. The counties of Athens, Hocking and Perry, which embrace the Hocking valley, produced 5,694,341 tons, or 38.4 per cent. of the entire output of the state. Perry county remains the banner producing county in the list with an output of 2,000,000 tons. In each of the counties of Hocking, Jackson, Athens, Belmont and Jefferson, the production exceeded 1,000,000 tons. Of the year's output 2,553,074 tons were produced by mining machines, an increase of 313,994 tons as compared with the preceding year. Hocking valley mines produced over 95 per cent. of the machine-mined coal.

An Aluminum Gunboat.

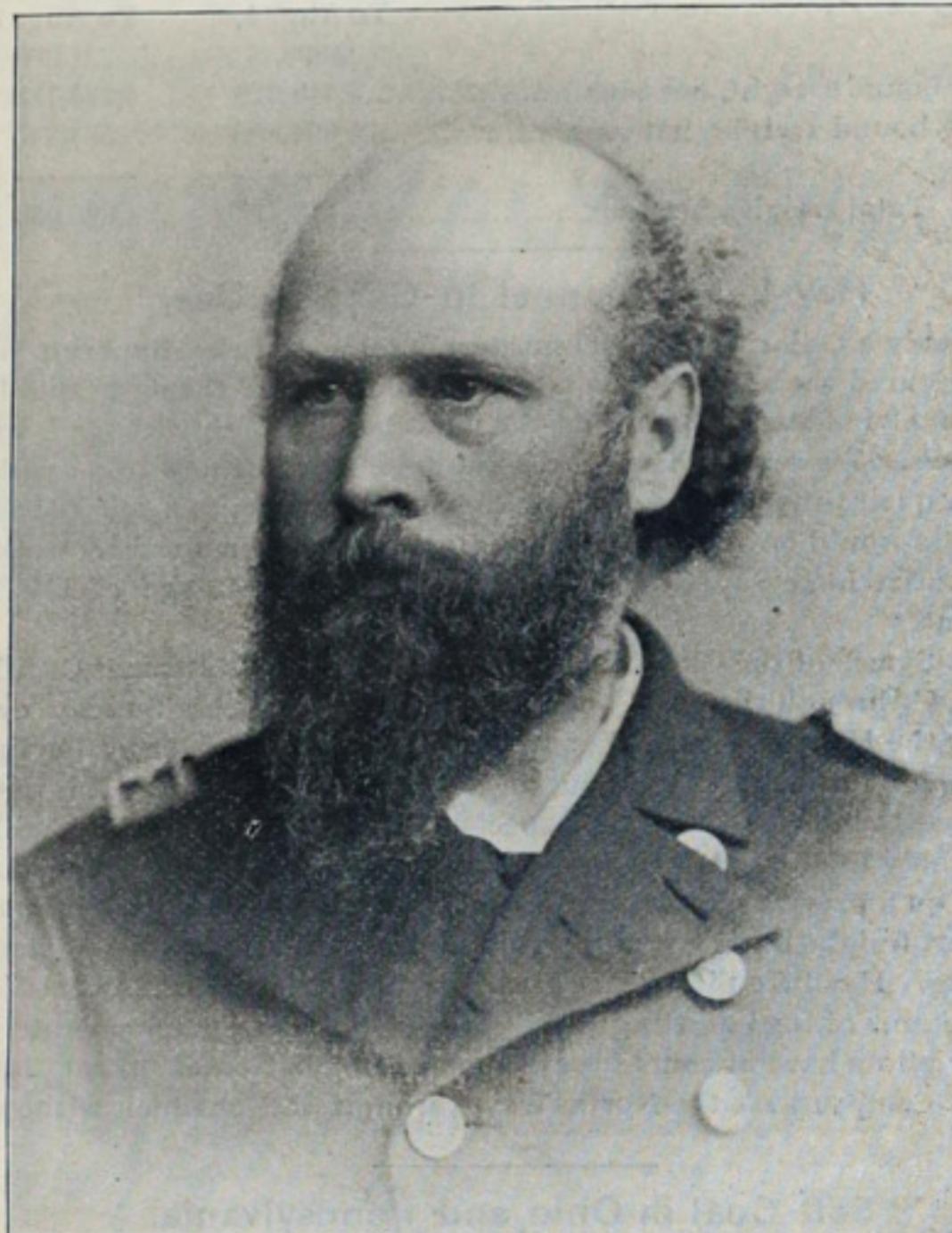
The British Naval and Military Record thus refers to a new torpedo gunboat built by the French government:

"The boat is constructed of aluminum and its extreme lightness will allow of its traveling at the rate of 31 knots an hour. This speed will beat the record, which at the present time is 29.3, obtained by the new Thornycroft torpedo gunboat trials a few days since. There is no doubt that aluminum is the coming metal, and will be used a great deal in ship construction. As the little launch, which came out at the Henley regatta, can move as fast as other launches of the same size with half their power, it is fairly certain that it will supersede the present brass fittings of the torpedo gunboats, which are very weighty. Another matter to be borne in mind is the fact that it will be possible to carry more coal if the boats can be made lighter in construction."

Commodore Melville, Engineer-in-Chief, U. S. Navy.

ILLUSTRATION AND ARTICLE, FROM THE ENGINEER, NEW YORK.

This gallant officer, whose portrait is given herewith, is probably better known throughout the world than any other American engineer, for he has not only made a brilliant record as an engineer but has established a reputation for heroism which thrilled every heart capable of appreciating bravery of the highest type. He was born in New York in 1841 and received his education in the public schools of that city. Intending to become a mechanical engineer, he served an apprenticeship in the machine



COM. GEO. W. MELVILLE, ENGINEER-IN-CHEIF, U. S. NAVY.

shop of James Binns of Brooklyn, "Boss Binns" as Melville still affectionately calls him. At the breaking out of the civil war, when barely twenty years old, he entered the navy as a third assistant engineer and began his life work. From the very beginning of his naval career he displayed the qualities which have made his reputation, absolute devotion to duty, dauntless courage and indomitable will power. There is no such word as fail in his vocabulary. After active service on several vessels on the blockade and as a volunteer in the torpedo flotilla under Admiral Porter, he was attached to the Wachusett, when she captured the Florida. Prior to the capture, information was desired concerning her battery. Melville volunteered for this dangerous service and succeeded in getting on board the Florida, but was driven off. He designed a torpedo for destroying her and was building it when the captain decided to make an attack by ramming. A conference of the officers was held before this decision was reached, and the chief engineer expressed a fear that the shock of ramming might fracture some of the steam pipes and cause the death of all in the engine room by scalding. Melville then volunteered to remain in the engine room alone and take his chances. After the capture, he was detailed as the chief engineer of the Florida, and was also selected to insure her destruction in case there was danger of her capture. After the war, he saw much active service and was always ready to volunteer for duty requiring the hardest work. When the Polaris relief expedition was organized, Melville volunteered and became the chief engineer of the Tigress. Under great disadvantages he kept the machinery in an efficient condition, enabling this little yacht in thirty days to go further north than Dr. Kane's expedition did in three years. In his official report, Admiral Greer, who commanded the ship, gives Melville the credit of securing the success of the expedition by his professional skill and energy.

In 1879 he volunteered for the Jeannette expedition. Up to this time his reputation was confined to the navy; when he had completed his heroic work in connection with this expedition, it was world wide. From the very first he seems to have been the main reliance of the ill-fated De Long, whose journals sound his praises again and again.

During the long imprisonment on the ice, Melville had many opportunities to display his skill and ingenuity in the effort to save coal, so precious to them. When the Jeannette was crushed in the ice and the terrible retreat was carried out, Melville displayed his wonderful ability

as a leader. He had charge of the "working gang" which cut the roads and transported the sledges. This was work of the hardest kind and much of it was done by the men with bare feet on the rough ice. Cheery words of encouragement for willing hands and a good "cussing" for the idlers made each day show substantial progress.

The story of the Jeannette is well known and space will not allow even an abstract here, but mention must be made of Melville's heroic self denial and fortitude. As soon as his party had reached a place of safety his thoughts returned to his comrades of the other boats, and he endeavored to go to their relief. He had been badly frozen so that he was almost helpless, yet, when word reached him that two "Americanishes" had been found in another village, he went to them immediately, learned the route they had taken, and at once started to the relief of De Long. Two natives went with him on whom he was absolutely dependent for everything. Hands and feet yet tender from the previous freezing were soon again almost useless. In 1891 congress passed an act advancing Melville a grade for his heroism on the Jeanette expedition. He volunteered for the Greeley relief expedition and contributed greatly towards its success by his advice in its preparation and outfit as well as by his work as chief engineer of the Thetis. In 1886 Secretary Whitney became acquainted with him and impressed with his ability. In a conversation Mr. Whitney said that he was anxious to build some ships that would surpass the records then being made in England and asked Chief Engineer Melville if he could design machinery to accomplish this end. The reply was: "Yes, if I can have the necessary assistance." This was given him and the result was the machinery of the San Francisco, which has been an unqualified success. When Engineer-in-Chief Loring resigned in 1887, Secretary Whitney had Melville appointed to the position, which he still holds.

His record during this period has been remarkable for its success. It practically covers the building of our new navy. All of his designs have been successful, and he has not been content to follow well tried plans, but has led in introducing new and progressive ideas. He advocated the use of tubulous or coil boilers and had them introduced on the Monterey, the first case of their use on large war vessels. Now, almost every country is adopting this policy. His bold step in using triple screws for the Columbia and Minneapolis has already been noticed. Commodore Melville is a man of striking personality, who would be picked out in a crowd as a remarkable man. Like most brave men, he is modest and unassuming, and in fact is retiring. His likes and dislikes are strong and displayed with thorough frankness. He likes directness in others and always shows it himself. His appreciation of his subordinates and his readiness to give them credit for their share in his success is remarkable, and has the effect of inspiring the greatest loyalty and zeal. Last year, at the World's fair, he was chairman of the marine division of the engineering congress, and by his executive ability and personal popularity succeeded, without the aid of any engineering society, in making it one of the most successful meetings, and its proceedings one of the most valuable collections of professional papers ever published.

Wonderful Records in Loading Coal.

In a previous issue we referred in a meager way the McMyler car dumping machine recently erected in Ashtabula, and we hope to be able to give shortly, with illustrations, a more detailed description of the machine and the railway plant connected with it. There is little doubt of the machine coming into general use in the handling of soft coal. The success attending its operation during the past two weeks would indicate that the improvement over all previous methods of handling coal is such that it will increase several times over the capacity of lake ports as regards the shipment of coal. In just twelve hours on Wednesday the steel steamer Yuma was loaded with 140 cars or 3,350 tons of coal.

Following is a record of work done with the machine during eleven days ending with Wednesday, the 8th inst.:

Name of boat.	Time of loading.	Amount of cargo, net tons.
Steamer Kearsarge.....	16 hrs.	3,300
" Choctaw.....	8 "	2,200
" Pease.....	8 "	1,000
" Manola.....	5 "	1,421
" Maritana.....	10 "	2,500
" Matoa.....	9½ "	2,500
" J. C. Gilchrist.....	9 "	1,950
" Yuma.....	12 "	3,350

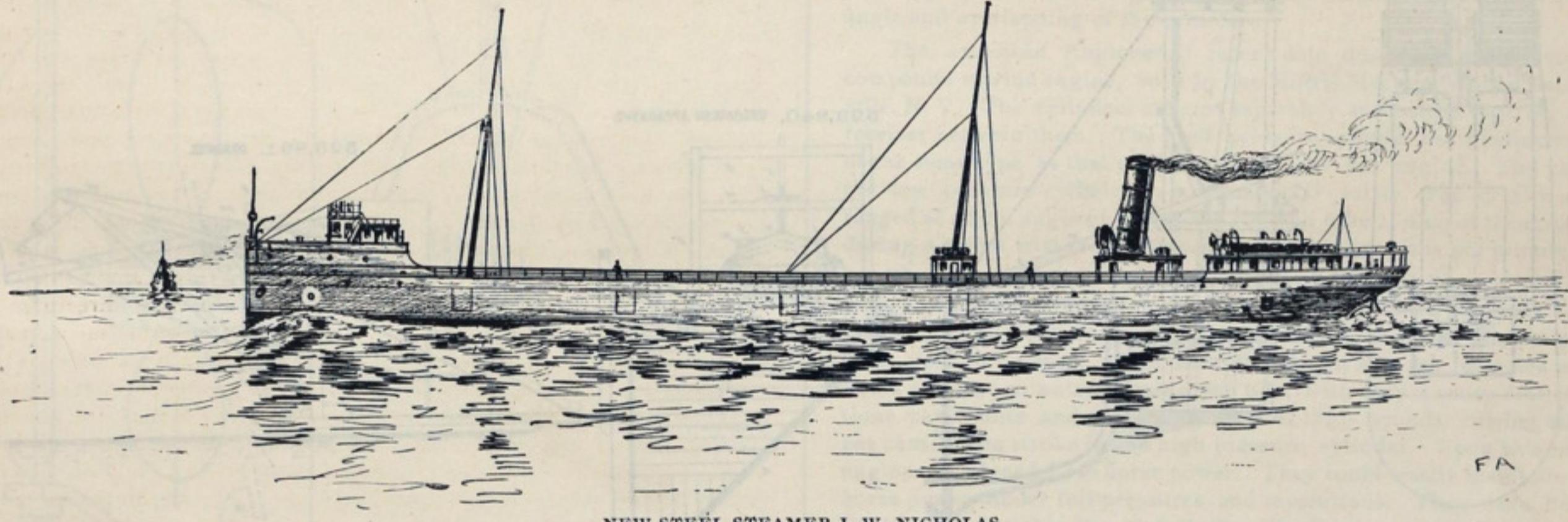
Reports on cargos loaded by means of the machine and delivered at upper lake ports are to the effect that the coal is in far better condition than that loaded by the bucket system. This is to be expected, as with the machine the loaded car is tilted into the hold of the vessel and the coal allowed to slide out in one mass, instead of being subjected to breakage first by shoveling and later by being dropped from the bucket.

A British chart covering Lake Superior entire, including north shore can be had from the MARINE REVIEW for \$1.

The Steel Steamer I. W. Nicholas.

The illustration herewith shows the steel steamer Isaac W. Nicholas, to be launched this week by the Cleveland Ship Building Company, for the Minch Transportation Company. She is a good example of the all-around modern freighter, being equipped for package freight, as described below, but this equipment will not interfere with 3,200 tons iron ore being carried on 15 feet draught. She was built under the rules and inspection of the Bureau Veritas, and will be ready for a cargo about September 15.

Her dimensions are 342 feet overall, 324 feet from the forward side of the stern to the after side of the stern post, 42 feet beam, moulded, and 26 feet 3 inches deep, moulded. The depth will enable the Nicholas to take advantage of the 20-foot channel when completed. The engines are of the well-known pattern of the builders, triple expansion, having cylinders 20,33 and 54 inches by 40 inches stroke. Steam is furnished at 170 pounds pressure by two boilers 12 feet 4 inches diameter by 12 feet 6 inches long, having 3,622 square feet total heating surface. The propeller is 12 feet 9 inches diameter by 15 feet pitch, which at 75 revolutions per minute is expected to drive the boat 11½ miles an hour loaded. Capt. Wm. Gerlach and Engineer Wm. Miller will command the boat and engines. She has 4 feet sheer forward and 2 feet sheer aft. The main floors are of plate and angles, spaced 2-foot centers, extending from the center keelson to the top of the water bottom. The main frames are bulb angles, spaced 2-foot centers, and extend from the top of the water-bottom to the spar deck. The spar deck is of steel and the main deck of wood. There are ten hatches 8 feet wide by 29 feet long, spaced 24-foot centers. All of the steel used in the construction of this ship is of the open hearth kind. There are some special features of her construction. She has three girder keelsons on each side of the center keelson, extending from stem to stern



NEW STEEL STEAMER I. W. NICHOLAS.

in one piece, not stopping at bulkheads. The middle one of the three girder keelsons is intercostaled between every frame and tied to the skin of the ship, which makes a very much stiffer bottom. The water-bottom is 4½ feet deep, and is divided into eight water-tight compartments. The lower hold is divided into three separate water tight compartments. There are four cargo gangways on each side of the ship, with shutters made of one plate each, with special arrangement for hanging and lifting. Each of the hatches is supplied with double hoisting drums, operated by paper frictions, and a main line of shaft which in turn is operated by a 12 by 12-inch vertical high pressure engine.

The cabins are of the regular barge style with the captain's, mates' and wheelmen's quarters located forward, the quarters for the balance of the crew being located in the deck house amidship and in the cabin aft. The captain's quarters and dining room are finished in the finest paneled, quarter-sawed oak, and all other rooms in the boat are finished in quarter-sawed oak ceiling, laid straight, diagonally, and various ways to give variety to the different finish of the rooms. She has a Williamson Bros' steam steerer located on the main deck directly under the pilot house, and connected with chains and wire rope direct to the quadrant. The American Ship Windlass Co's new design of windlass and capstan is located forward, and the same makers' capstan is located aft. One of the builders' double 8 by 8 hoisting engines is located on the spar deck.

Steam gauges etc., were furnished by the Ashcroft Mfg. Co. Boston, and the oil cups and other engine specialties are of the Lunkenheimer manufacture. A patent Chase fog whistle machine is part of the outfit, which includes a set of Thos. Drein & Sons' life boats. The anchors are of the new Dunn stockless type, the chain being furnished by the Hayden Company, Columbus, O. The ship chandlery outfit was furnished by the Upson-Walton Co.

Chautauqua Lake free August 20 in connection with a \$3.00 Niagara Falls excursion ticket via the Nickel Plate road. Cleveland ticket offices 224 Bank street, 534 Pearl street, and depots.

The Consorts for Minnesota Line Steamers.

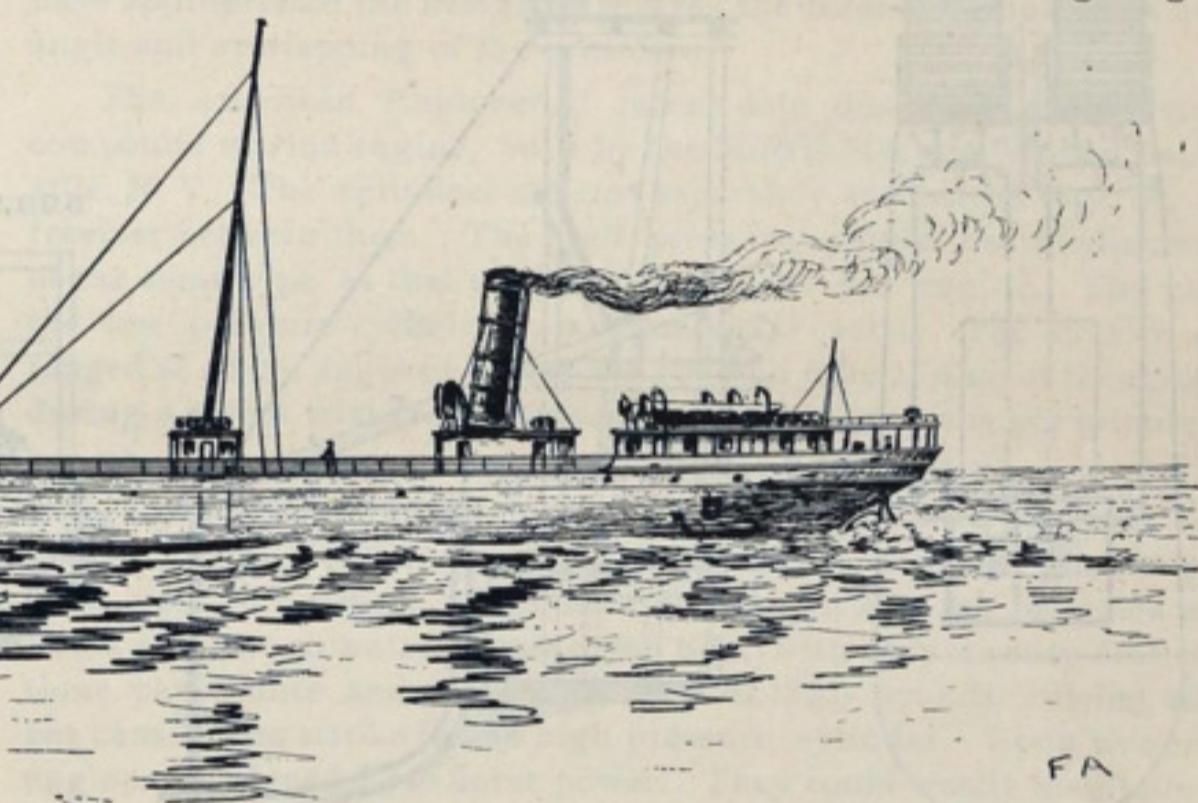
Consorts for the two steel schooners, or tow barges, to be built for the Minnesota Steamship Company, and which have been talked of for some time past, have just been placed with the Chicago Ship Building Company. The boats are to be 302 feet long, 41 feet beam and 24 feet depth, with nine hatches and 3 masts, carrying sufficient sail to be of assistance when towing in favorable sailing weather and to care for themselves if separated from the towing steamer. Rules of the United States Standard Register will govern their construction, and their equipment will include electric light plants, steam windlasses, capstans and deck hoists, and probably steam towing machines of the kind made by the American Ship Windlass Company of Providence, R. I., for handling wire rope.

Chance for a Government Contract.

Within a few days now the revenue marine branch of the treasury department will ask for bids on two steel revenue cutters, that are to cost not more than \$175,000 each. One of these vessels is for the New England coast and the other is for the lakes. The civil sundry appropriation bill, which has just passed both houses of congress, provides \$150,000 with which to begin the construction of these boats. It would not, of course, be surprising if the contract for both of the boats is secured by some lake yard.

Regarding the Hull of the North West.

EDITOR MARINE REVIEW:—I am interested in the subject "Faster Passenger steamers," and believe that the North West would have been two miles an hour faster with a better shaped hull. The influence of the snub-nosed canal boat is still to be seen in the water bruising freighters,



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and simply a modification of these latter forms of hull seems to be the best the same builders can offer in a speed boat. Do all you can to urge better attention to easy water lines, and illustrate and note all that is being done in the interest of better speed. Nowhere in the world is it of more consequence than on the lakes, on account of the short season.

Johnstown, Pa.

J. B. ROBINSON.

[Without attempting to defend or criticise the design of the North West, it may be well to note in connection with the foregoing communication that the question of limited draft was of considerable importance in the design of the boat.—ED.]

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stock of wheat and corn in store at the principal points of accumulation on the lakes on August 4, 1894:

	Wheat, bu.	Corn, bu.
Chicago.....	18,643,000	1,380,000
Duluth.....	3,799,000	9,000
Milwaukee.....	838,000
Detroit.....	1,174,000	5,000
Toledo.....	2,700,000	51,000
Buffalo.....	1,488,000	195,000
Total.....	28,642,000	1,640,000

At the points named there is a net increase for the week of 1,683,000 bushels of wheat, an increase of 135,000 bushels of corn.

General Poe's assistant, First Lieutenant W. L. Sibert, will change places with Capt. Carl F. Palfrey, stationed at Little Rock, Ark.

The most convenient train for the west is the fast express via the Nickel Plate road, known as No. 5, leaving Cleveland 11:12 a. m., daily including Sunday, and stops at Bellevue, Fostoria and Ft. Wayne, arriving at Chicago at 9:35 p. m. Palace buffet sleeping cars attached. 20-131

Illustrated Patent Record.

SELECTED ABSTRACTS OF SPECIFICATIONS OF A MARINE NATURE—FROM LATEST PATENT OFFICE REPORTS.

523,817. STERN PADDLE-WHEEL AND RUDDER. John M. Mitchell, Toledo, Ohio. Filed Feb. 18, 1891. Renewed Jan. 31, 1894. Serial No. 498,663.

Claim.—The combination with the hull of a vessel, of two independently operated paddle wheels arranged on the rear thereof and within the width of the stern, a pair of rudders parallel to each other in front of each independent paddle-wheel, and to the rear of the hull each pair acting in unison and independent of the other pair, and the independent steering devices for operating the rudder.

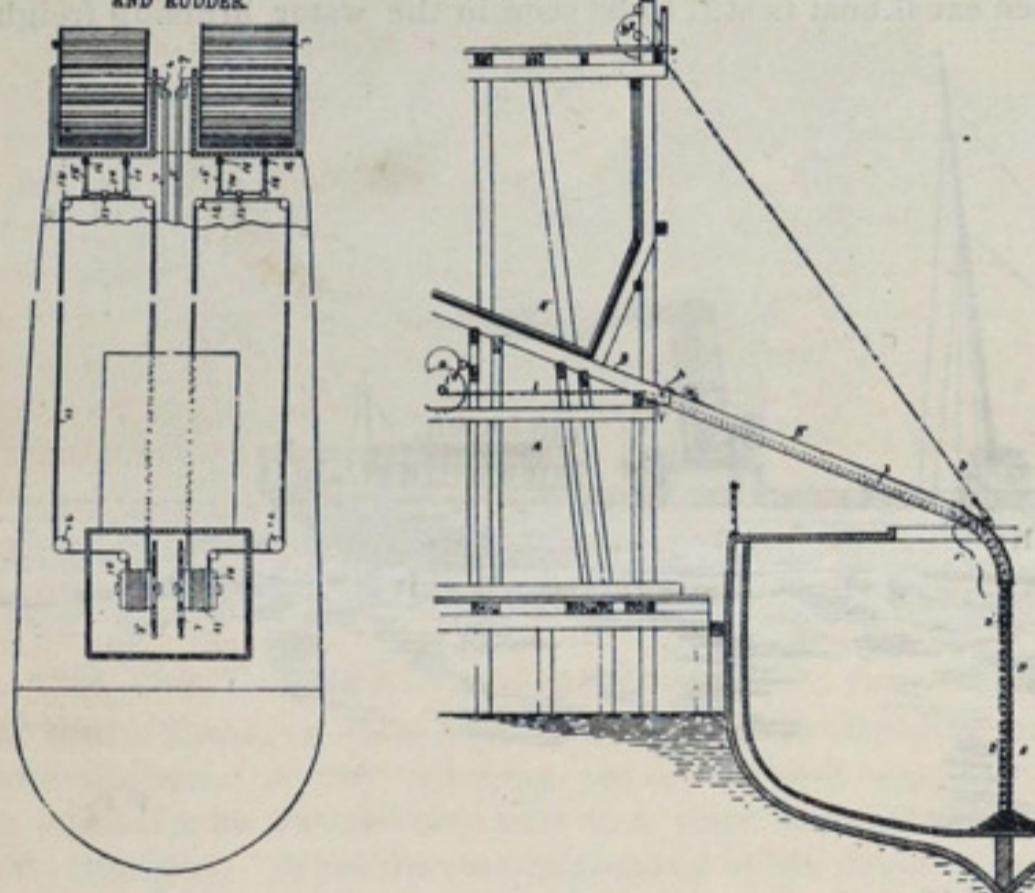
523,851. CHUTE FOR LOADING VESSELS, CARS, ETC. James M. Dodge, Philadelphia, Pa., assignor to the Dodge Coal Storage Company, Naugatuck, Conn. Filed May 9, 1894. Serial No. 510,602.

The combination of a chute, a telescopic extension consisting of a series of quadrangular sections, links extending from one section to another, rollers adapted to travel upon the chute and means for operating the telescopic section.

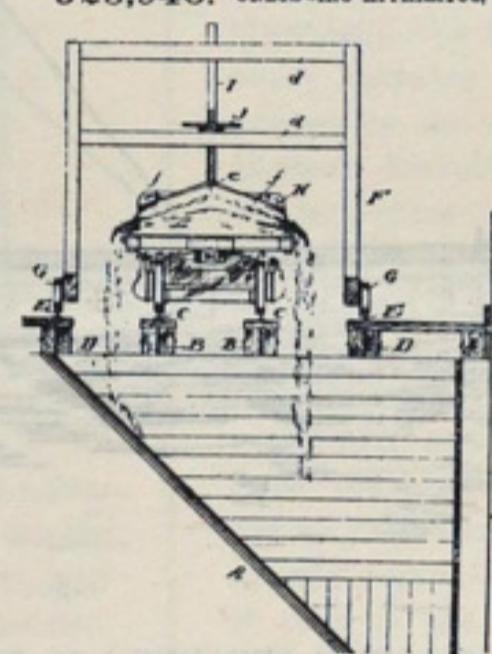
523,940. UNLOADING APPARATUS. Alexander McDougall, Duluth, Minn. Filed Nov. 18, 1893. Serial No. 491,339.

Claim.—The combination with an ore dock provided with a series of pockets A, tracks C, above said pockets for loaded flat cars and tracks E, parallel with the tracks C, of a sustaining frame F, carried by the tracks E, a plow H, mounted upon said sustaining frame, and means for holding said sustaining frame and plow stationary while the cars are moved with respect to the same.

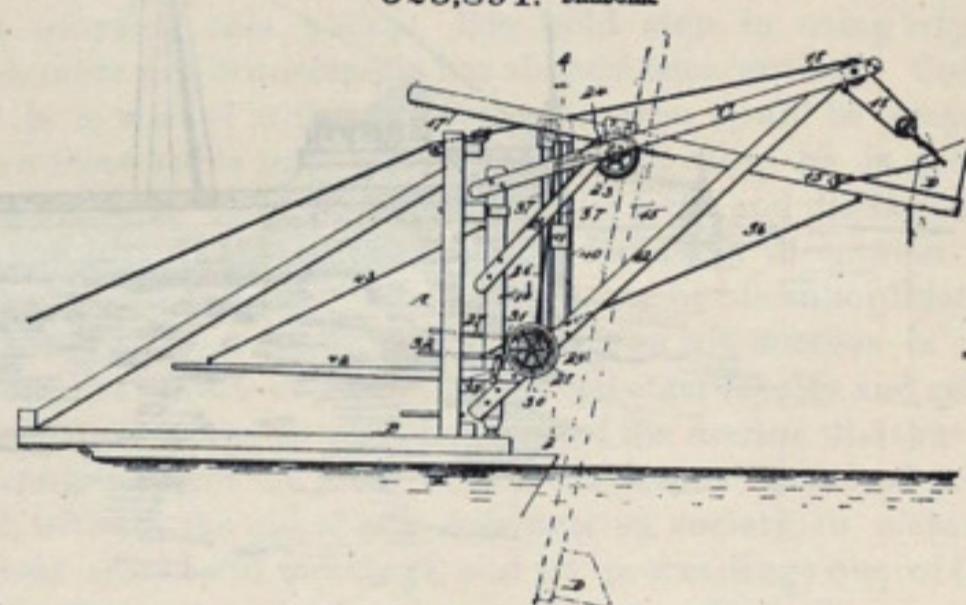
523,817. STERN PADDLE-WHEEL AND RUDDER. 523,851. CHUTE FOR LOADING VESSELS, CARS, ETC.



523,940. UNLOADING APPARATUS.



523,891. DREDGER.



523,891. DREDGER. Samuel P. Hedges, Greenport, N. Y. Filed April 11, 1894. Serial No. 507,164.

Claim. In a dredger, the combination, with a frame, a crane carried thereby, a dipper arm, and a mechanism substantially as described, for raising and lowering said arm, of a controlling mechanism for the dipper arm, consisting of a shaft journaled in a support moving with the crane, drums secured upon said shaft, a pull-back rope or chain connected with the dipper arm and wound upon one of the drums, an actuating rope or chain connected with the other drum on the shaft and wound thereon in an opposite direction to the winding of the pull-back rope or chain upon its drum, the actuating rope or chain being connected with a weight capable of rising and falling, a brake wheel located on said shaft, a brake engaging with said wheel, and means, substantially as shown and described, for operating the brake, and a hand wheel attached to the shaft whereby it may be operated by hand.

Electrical Telometer.

Williamson Bros. of Philadelphia, who have had a great deal of experience in the construction of steering engines, are introducing an electrical telometer for operating the steering engine, and they report success with the apparatus in a voyage on the Red Star steamship Friesland. The steering wheel is located on the bridge, while the steering engine is located aft at the rudder. The operation of steering is the same as ordinarily, that is with a small steering wheel, making about eight revolutions from port to starboard. The connection between the bridge and the gear aft is an electric cable, which contains the wires for manipulation. The wheel on the bridge can be put at any point desired and the valve of the steering engine will be operated and the rudder in turn will place the helm at the rudder at the corresponding point that the steering wheel has placed the indicator on the column on the bridge. The wheel can be put hard a port and the rudder will be moved accordingly. The wheel can be brought back to any point desired, and the rudder will show a correspond-

ing angle, or in other words, wherever the wheel is turned the rudder will have a corresponding angle. This machine performs all the functions of a steering engine, and can be used for handling the rudder direct without the steam engine if desired, the only question being that of the size required to do the work. On board the steamer Friesland, as on board other large ocean steamers where the engine is placed in the stern of the vessel, the electric telometer is used to take the place of the shafting, which on account of the great length required to run to pilot house, is found very objectionable, not only for the trouble in erecting, but also that it is found hard to handle, while with the electric telometer, the power required is so small that a child could handle it with ease.

Coast Canal Projects.

Several articles favoring the construction of a deep water canal along the Atlantic seaboard have appeared of late in the Review of Reviews. A reduction in distance between populous centers of industry is one of the arguments introduced in favor of this interior coast waterway. Thus it is claimed that the Cape Cod canal, which is projected to connect the waters of Buzzard's bay with Cape Cod bay at Sandwich, and is about 9 miles long, will reduce the distance between Boston and New York from 398 to 250 miles, a saving of 140 miles, or 35 per cent. The canal across New Jersey, from the Raritan bay to the Delaware river, 34 miles long, would reduce the distance from 273 to about 90 miles, effecting an economy of 183 miles, or over 67 per cent.; while the enlargement of the present Chesapeake and Delaware canal, with a 10 feet draught and a length of 14 miles, would reduce the distance by water between Philadelphia and Balti-

more from 430 to 112 miles, a saving of 318 miles, or 74 per cent. It would appear, then, that by the reconstruction or enlargement of 57 miles of canals, the present outside distances between these centers could be reduced 1,101 to 452 miles, a saving of 60 per cent. This in itself would be an ample justification for the expenditure of a very large amount of capital to secure the result, the Review claims, but the physical conditions of the country which would be traversed by these canals is such that the actual cost of construction would be comparatively small. The estimated cost of the New Jersey link is \$12,500,000, while the Delaware enlargement could be completed to tide water level for \$5,000,000, with the improved machinery now available.

Mr. R. VanSlyke has been appointed agent for the Grummond line at Cleveland. A new office has been opened at No. 3 River street, where freight will be received and passengers booked for Mackinaw, St. Ignace and Lake Michigan west shore ports. The Grummond tugs stopped their raft towing long enough recently to do three days work on the stranded steamer Rhodes.

The steamers Minnie E. Kelton and Unique, both registered in the Port Huron district, have been given official numbers by the bureau of navigation, that of the former being 92,601 and the latter 25,290. The Unique's tonnage is 381.34 gross and 190.67 net and the Kelton 632.13 gross and 504.40 net.

As the battle between guns and armor plates goes on we are reminded of the criticism of an old-time lover of base ball who does not favor some of the changes brought into the game of late. "They seem to want batters who can hit any pitcher," he says, "and pitchers whom no batter can hit."

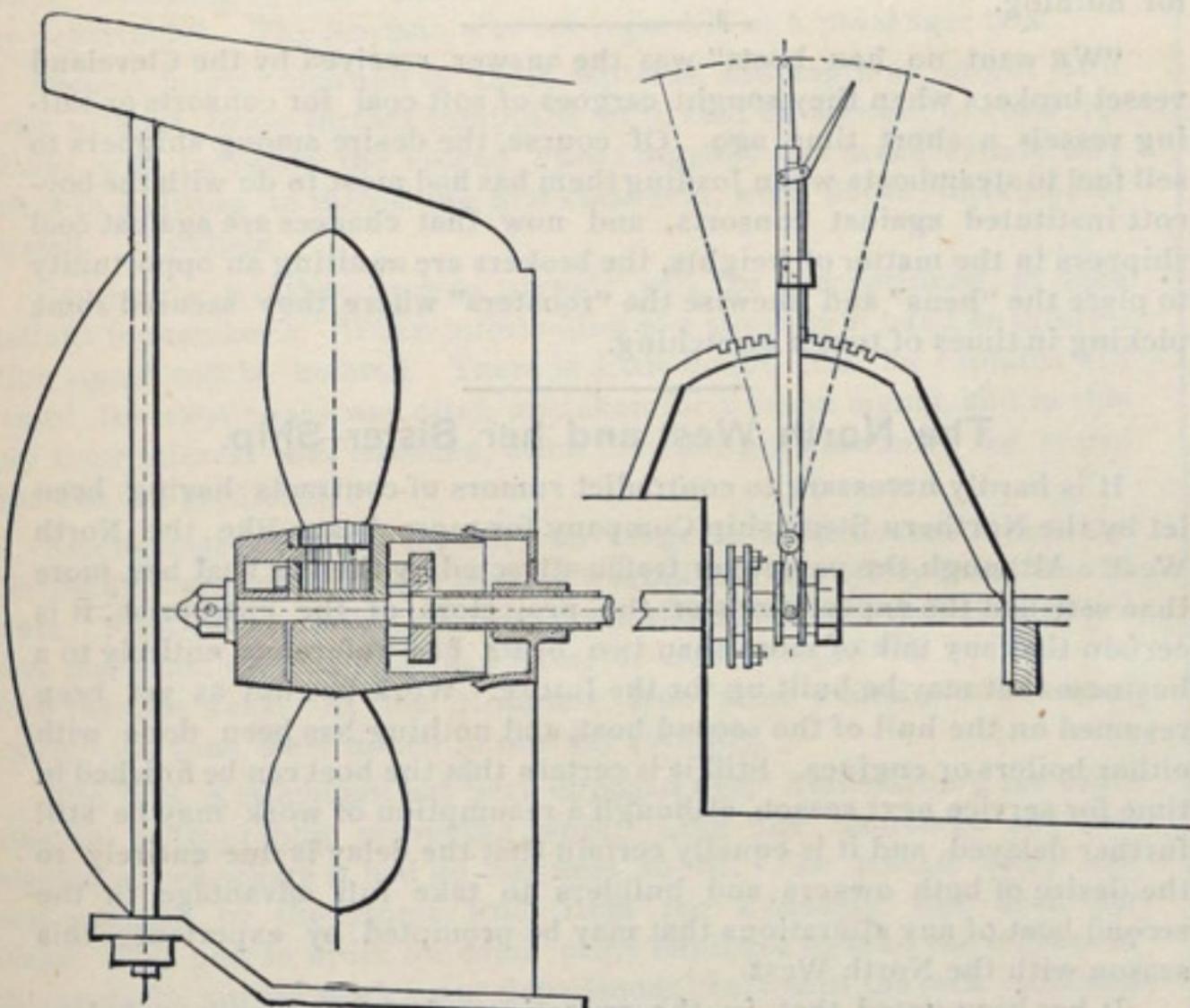
In the patent column of this issue will be found a description of a device for unloading iron ore from cars into dock pockets, which was recently patented by Capt. Alex. McDougall of Duluth.

Reversing Screw Propellers.

From Advance Proofs of Industry, San Francisco.

The history of feathering or reversing propellers is becoming a long one. The objects to be obtained are especially desirable, and the means or mechanism for its accomplishment admits of an endless array of contrivances, and some of them produced have been absurd from a mechanical point of view. Mr. Dickie, of the Union Iron Works, San Francisco, says that when he sees a countryman approaching him with a roll of papers under his arm he knows there is a new propeller of some kind to be discussed.

The objects of a reversible propeller are: (1) to permit the driving power to run continuously in one direction, the reversing function being shifted from the engine to the propeller blades; (2) the act of reversing is rendered instantaneous, a very important matter, especially in the case of small boats; (3) control of the pitch, or convolution of the vanes, so as to adapt the propeller to variations of speed and power. Either of these things is enough alone to call out effort in the way of contriving reversible propellers. The gas engines, which are not reversible for various reasons we will not discuss here, and their extensive application to propulsion has given new interest to reversible apparatus, but thus far mainly for the screw shaft, or between the engine and the propeller. In England, Mr. McGlasson has devoted some years to this subject of reversible propeller vanes, and has fitted up successfully a number of boats of



small power. On the continent, too, there have been a number of inventions, but the present one, it seems to us, is the most simple and complete that has appeared.

Mr. S. G. Hindes, who is a mechanic and engineer, wisely went to work to reduce the required mechanical elements to their most simple form, namely, cylindrical shanks for the vanes provided with toothed sectors engaged by racks operated by a sleeve around the screw shaft passing through the stern bearing. This seems all simple enough, and it has been done or attempted before, but in a different manner, as will now appear. To secure lateral stability of the vanes within the limits of the boss or hub has been one difficulty. This stability Mr. Hindes secures by constituting the toothed section of the stem a portion of the bearing, which, as seen in the drawing, extends the whole distance from the shaft to the periphery of the boss. Then to provide for what may be called fulcrum wear he cuts away the neutral or central part of the bearing, employing the space or groove thus provided as a collar channel to hold the stem longitudinally and resist centrifugal force. Detents or half collars fitting into these grooves are formed integrally with the cap on the end of the boss, so that as soon as this is removed the vanes are free.

We mention these things as principal features. There are many more, but, as a whole, we think the inventor has gone back to "first principles," so to speak, and reduced the various elements to their most simple form, and with correct proportions. We have practically seen and handled the propeller, and must admit there are many favorable results that would not be suspected inferentially. There is absolute control of a boat the same as if the operator was using a pair of oars, and the analogy holds good down to turning the boat as if it were on a pivot. This is done by reversing the screw and setting the tiller accordingly. Mr. Hindes is now engaged on practical experiments with his propellers, and will soon determine final proportions and arrangement so as to prepare standard drawings for various sizes.

Trade Notes.

Nearly all departments of the plant of the Carbon Steel Company at Pittsburgh, manufacturers of open hearth steel, are in operation on double turn.

Almost a year and a half ago Mr. W. D. Kearnott came to Cleveland to represent H. R. Worthington. Some time since he was given the state agency, and a large sales room was opened on Water street. Of course this required some extra office help. This has just been provided in a small way through the engagement of Thornton Campbell Kearnott, a very young man weighing but seven pounds. He is solving successfully the problem of raising milk from the bottom of a six-inch bottle, his greatest trouble being in overcoming the vacuum.

In General.

Charles H. Cramp has an article in the North American Review for August on "Sea Power of the United States."

Harland & Wolff, famous Belfast builders, are said to have secured a contract from one of the Atlantic steamship companies for a triple screw steamer of 3,000 tons.

Secretary Herbert has ordered the board of bureau chiefs, navy department, to report upon the feasibility of transforming the dynamite cruiser Vesuvius into a torpedo boat of the first class, together with the cost of such operation.

Thomas Main of Hoboken, N. J., writes the Engineer of New York claiming patent rights to the design of engines of the Daring, fastest of the British torpedo boat destroyers. He says that the engines were patented in Great Britain Dec. 21, 1886, and that the Messrs. Thornycroft have appropriated the design as regards the balanced crank shaft and the angle and overlapping of the cylinders."

The American Engineer of recent date describes and illustrates a compound marine engine, built by the Morris Machine Works, Baldwinsville, N. Y. The cylinders are cast separately and bolted together with a receiver between them. The high pressure cylinder has a balanced valve of the same type as that used in the straight line engine. The valve on the low pressure cylinder is a common "D" valve. The cranks are arranged at an angle of 90 degrees to each other. One of these engines during a recent trial ran continuously at 450 revolutions per minute.

The new side-wheel steamer Priscilla of the Fall River (Long Island Sound) line, was intended to develop only 8,500 horse power in her engines nominally, but she largely exceeds this in practice. On a trip from New York to Newport under natural draught she ran 160 miles in nine hours and two minutes, against the tide, with only twenty-four revolutions per minute and a steam pressure of 122.5 pounds, cutting off at 61 per cent. of the stroke in the high pressure cylinder. Upon this run the engines developed 9,345 horse power. They could easily maintain 10,000 horse power under full pressures and revolutions. They were built by the W. & A. Fletcher Co., New York.—The Engineer, New York.

Some Facts Regarding Premiums.

There are about forty-five ships built and building, exclusive of tugs, that may be put down as belonging to the new navy. Of these the first four, the Chicago, the Atlanta, the Boston and the Dolphin, were not built on the premium and penalty system, which was first introduced under Secretary Whitney. There are ten now building and not yet tried whose premiums or penalties have not yet been determined. Next there are the five double-turret monitors Puritan, Miantonomoh, Monadnock, Amphitrite, and Terror, the second-class battle-ships Maine and Texas and the protected cruisers Cincinnati and Raleigh, all either built or building in the navy yards, and hence not subject to premiums or penalties. Subtracting these vessels we have a total of twenty-two left. Of these, one, the Vesuvius, was not built on the premium system; a second, the Cushing, did not earn a premium; three others, the Charleston, the Monterey and the Petrel fell short of their requirements and became liable to penalties of \$33,384, \$32,823 and \$485 respectively. It is a noteworthy fact that all these three were built under the system of premiums for horse power at the rate of \$100 per unit. For very good reasons the penalty of the Charleston was remitted by congress. It is remarkable that, under the speed guarantee, no penalty has ever been suffered by one of our war vessels. Subtracting the five vessels last referred to, we have a remainder of seventeen vessels that have earned premiums. These, assuming that the calculation for the Minneapolis is not varied from its first announcement, have earned the prodigious total of \$2,264,586 in premiums. It is safe to expect that this will be increased to \$3,000,000 by the vessels awaiting trial.—Exchange.

U. S. ENGINEER OFFICE, 34 West Congress street, Detroit, Mich., August 6, 1894.
Sealed proposal for Operating Machinery for the 800-foot Lock, St. Mary's Falls Canal, will be received here until 2 p.m., September 5, 1894, and then publicly opened. All information furnished on application.

O. M. POE,
Col. Corps of Engineers.

MARINE REVIEW.

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O.

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,761 vessels, of 1,261,067.22 gross tons register in the lake trade. The lakes have more steam vessels of 1,000 to 2,500 tons than the combined ownership of this class of vessels in all other sections of the country. The number of steam vessels of 1,000 to 2,500 tons on the lakes on June 30, 1893, was 318 and their aggregate gross tonnage 525,778.57; in all other parts of the country the number of this class of vessels was, on the same date, 211 and their gross tonnage 314,016.65. The classification of the entire lake fleet on June 30, 1893, was as follows:

Class.	Number.	Gross
Steam vessels.....	1,731	828,702.29
Sailing vessels.....	1,205	317,789.37
Canal boats	743	76,843.57
Barges.....	82	37,731.99
Total.....	3,761	1,261,067.22

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

	Number.	Net Tonnage.
1889.....	225	107,080.30
1890.....	218	108,515.00
1891.....	204	111,856.45
1892.....	169	45,168.98
1893.....	175	99,271.24
Total.....	991	471,891.97

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

	St. Mary's Falls Canal.			Suez Canal		
	1893.	1892.	1891.	1893.	1892.	1891.
No. vessel passages	12,008	12,580	10,191	3,341	3,559	4,207
Ton'ge, net regist'd	9,849,754	10,647,203	8,400,685	7,659,068	7,712,028	8,698,777
Days of Navigation	219	223	225	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

ALTHOUGH officers of the Lake Carriers' Association are saying nothing about the manner in which they were "turned down" by Gen. Alger's handiwork among members of the commerce committee of the senate who killed the raft towing regulations in the river and harbor bill, it is now plain to be seen that Senator McMillan of Michigan, who was expected to favor the stand taken by the vessel owners regarding the rafting business, and who had in fact been entrusted with the care of the raft clause for the vessel owners, should have been considered an opponent of the regulations from the start. One sentence from a Washington dispatch explains this. Here it is: "A few days ago, Senator McMillan of Michigan sent for Gen. Alger in haste, for the conferees were about determined to let the house bill stand." The distinguished senator from Michigan was acting in the double role of serving both Gen. Alger and the vessel interests, but his services to the former were of most avail. Henceforth he must be regarded as opposed to the desires of the vessel owners regarding raft towing, although it must be admitted that he has served them well in other matters.

BARRING the loss of raft towing regulations in the river and harbor bill, the measure as regards all appropriations, must be taken as highly satisfactory to lake interests. The bill awaits only the signature of the president. No changes were made by the conference committee in the numerous appropriations provided for harbors and connecting waterways on the lakes, and the list as reported in the REVIEW of July 26 is correct. The bill as it passed the house carried appropriations amounting to \$9,538,689.56. It was increased by the commerce committee of the senate \$3,087,490.44, and amendments carrying appropriations amounting to \$164,500 were made in the senate. As the bill passed the senate it carried \$12,790,680. It was reduced in conference \$1,292,500 and as reported by the conferees and finally adopted by both houses it carried \$11,478,180.

OTHER states as well as New York and North Carolina can now secure old war vessels, to be used by state naval reserve organizations for purposes of drill and instruction. A bill just passed by congress gives the secretary of the navy power, upon written application from governors, to loan these vessels to states having a regularly organized naval militia. The bugbear of treaty relations with Great Britain regarding the maintenance of war vessels on the lakes will undoubtedly be raised if any of

the lake states make application for the privilege conveyed by this act, but it would seem that a determined effort on the part of those interested here in a naval militia would result in overcoming the opposition. The lakes certainly afford great opportunity for the building up of a naval reserve.

ALL commercial bodies in lake cities should accept the invitation of the city council of Toronto to send delegations to the canal convention to be held shortly in that city. The people of Toronto are to be commended for the liberality in inviting commercial organizations on this side to discuss with them the question of how to best promote the project of deepening the Canadian canals to 20 feet. The subject is a live one, as the canals referred to are not of the visionary kind. They are already a reality in part, but the policy upon which their completion is outlined is regarded of too limited a character.

PROBABLY no class of vessel men connected with the business has suffered, on account of the depression in lake trade, a greater loss, in proportion to the business done, than the ship brokers of Chicago. A prominent Cleveland vessel owner wired one of them the other day, offering four big steamers at 1½ cents for grain to Buffalo. The going rate was but ¾ of a cent, but the four big boats were offered collectively as an inducement. The answer was that all the brokers in Chicago couldn't load the boats even though it might be agreed that they should take the grain for nothing.

"WE want no hen boats" was the answer received by the Cleveland vessel brokers when they sought cargoes of soft coal for consorts or sailing vessels a short time ago. Of course, the desire among shippers to sell fuel to steamboats when loading them has had most to do with the boycott instituted against consorts, and now that chances are against coal shippers in the matter of freights, the brokers are awaiting an opportunity to place the "hens" and likewise the "roosters" where they secured some picking in times of tough scratching.

The North West and her Sister-Ship.

It is hardly necessary to contradict rumors of contracts having been let by the Northern Steamship Company for more boats like the North West. Although the passenger traffic attracted by the big boat has more than satisfied the expectations of the projectors of the enterprise, it is certain that any talk of more than two boats has reference entirely to a business that may be built up for the future. Work has not as yet been resumed on the hull of the second boat, and nothing has been done with either boilers or engines. Still it is certain that the boat can be finished in time for service next season, although a resumption of work may be still further delayed, and it is equally certain that the delay is due entirely to the desire of both owners and builders to take full advantage in the second boat of any alterations that may be prompted by experience this season with the North West.

It has been noted that in the operation of the Belleville tubulous boilers more difficulty than was expected has been met with, on account of scale-making matter in lake water, and this is very probably one of the main subjects under consideration. Although those most interested in the boat have had little to say in this regard, there are practical engineers who have also given the subject attention, and who are of the opinion that, as in the case of salt water, surface condensers will be required for the successful operation of sectional boilers on the lakes.

Lake Freight Matters.

With practically 4,000,000 tons of ore moved on Aug. 1, vessel owners are not expecting any increase of importance in ore freights, especially as it is generally agreed that idleness in the furnace districts has been too long delayed. The question is not one of how much the furnaces will use before the opening of navigation next year, but rather how much can be cared for on the docks. But this probability of a limited ore movement is having an effect on the soft coal situation. Soft coal is being moved as it never has been before, and it would not be surprising if 700,000 tons or more is shipped to Lake Superior during the present month. It is expected that if the shipments for the season are to reach in the aggregate even 70 per cent. of last year's movement it will be necessary to pay freights on coal that will warrant vessels in coming down the lakes light, and on this account there is little disposition now to tie up to freight contracts. Lake Michigan rates are based on 55 cents to Milwaukee, while the rate to the head of Lake Superior is strong at 40 cents. Ore rates are steady at 60 cents from the head of the lakes, 55 cents from Marquette and 40 cents from Escanaba.

Greater Lorain.—To meet the requirements of travel between Cleveland and Lorain, the Nickel Plate road will increase the present service on Monday, Aug. 13th, by adding one additional passenger train in each direction, leaving Cleveland at 9 a. m.; returning, will leave Lorain at 2 p. m., daily except Sundays.

Around the Lakes.

Sealed bids for the wreck of the Waldo A. Avery, now lying at Dun-
can City, Mich., can be sent to C. A. Macdonald, Chicago until Aug. 10.

In another part of this issue an advertisement from Gen. Poe will be found calling for proposals for operating machinery for the new 800-foot lock at Sault Ste. Marie.

Lists of lights and fog signals on the lakes, corrected to the opening of navigation 1894, will be sent free of charge to vessel masters on application to the light-house board, Washington, D. C.

At Two Harbors a few days ago the wooden steamer Gratwick was loaded with 1,760 gross tons of ore in forty-five minutes, and fifteen minutes later the boat was trimmed and ready to proceed with her cargo.

Our Toledo correspondent says that Capt. Alfred Mitchell visited that port on his way up the lakes with his family on the R. L. Fryer. He adds that he is a jolly good fellow, and marine men who did not already know him are now his warm friends.

The REVIEW's comment on the Union dock at Sault Ste. Marie is bearing fruit. A petition is being circulated asking the government to purchase the dock. Vessels discharging cargo there are in the way of vessels entering the lock.

As was generally expected, the fine of \$1,000 imposed upon the Menominee line steamer Norman, for not having her life boats hanging to davits, according to passenger boat rules, has been remitted by the treasury department. The Norman was not regarded as a passenger boat.

Owners might mention to their captains, and captains might jot it down without being further reminded of it, that on account of close relations with railroads, the Toledo Fuel Company can make satisfactory prices in addition to furnishing first class coal, with docks conveniently located. Try them.

Cautionary weather bureau signals will be discontinued at lake stations September 1. When information of a storm is at hand an information signal will be hoisted. There is little doubt that by captains not posted, the cautionary was often mistaken for a storm signal, and in this way their interest was lessened, when they did not encounter the storm that was not predicted.

Among notes from the Mesabi iron range it is announced that the Cincinnati Iron Company has secured a reduction in royalty from 50 to 35 cents. First vessel shipments from the Auburn, Norman and Hale mines were made last week. The Lake Superior also shipped its first ore to dock the past week. At the Mountain Iron mine a total of 390 cars, or nearly 8,900 tons, were mined in one day recently.

The U. S. S. Michigan has been engaged near Amherstburg for some time in hydrographic surveying work. Like the Kearsarge she discovered a rock where it had no business to be. She leaked badly and was released by the Home Rule from the Canadian side near Bar Point. It is now in order for some army engineer to send the officers in charge of the survey work a war department chart with the rock indicated in red.

A steam yacht 74 feet long and 12 feet beam has just been launched at Toronto, to be employed in the service of the Salvation army along the lakes. It has been named the Wm. Booth and will soon start on a trip through the Welland canal, Lake Erie, Lake St. Clair and Lake Huron. After returning to Toronto she will proceed down the lake and River St. Lawrence to Rimouski, from where she will bring back a number of Newfoundlanders, who will be landed there by the Salvationist, another of the vessels owned by the army and engaged in Atlantic coast service.

A Detroit paper has taken a cue from some correspondence in the REVIEW, in calling attention to the success of the C. & B. Line and the need of a new boat or two for its service. The item states that Mr. Newman tried to buy the Alpena or Mackinaw this summer, but couldn't get either one, and that an order would probably be placed this fall for a duplicate of these boats. Considering the success of Detroit-built side-wheelers this may be true, but it isn't according to geography, and the Detroit builders ought not to expect this contract. It belongs to Cleveland, and besides the heaviest stockholder in the C. & B. Line has an interest in a ship yard on this side of the lake. However, there is no telling what will happen these days.

August 20, excursion to Niagara Falls \$3.00 round trip via the Nickel Plate road. Cleveland ticket offices 224 Bank street, 534 Pearl street. 16

Have you heard about "Summer Outings," descriptive of picnic and summer resorts along the line of the Nickel Plate road; "Country Homes," a list of, open to summer boarders located on the Nickel Plate road adjacent to the south shore of Lake Erie; "Summer Tours," an illustrated and descriptive folder of famous resorts in the east; "Red Book," gives routes and rates for summer tours; issued by the Nickel Plate road? If you desire copies mailed free address B. F. Horner, general passenger agent, Cleveland, O.

Aug 30

Miscellaneous Mention.

One pound of cork is amply sufficient to support a man of ordinary size in the water.

Commander George F. F. Wilde has been selected to succeed Capt. Robley D. Evans as naval secretary of the light-house board, Capt. Evans having been assigned to the command of the cruiser New York.

Simon Ingersoll, the inventor of the Ingersoll rock drill, died at his home in Glenbrook, Conn., on July 24, at the age of seventy-six years. He died poor, although others made fortunes out of his inventions.

Naphtha in bulk is now being carried across the Atlantic. The steamer Heligoland left Philadelphia a few days ago with 1,200,000 gallons of the oil in tanks. Hitherto, owing to its dangerously explosive character, the fluid has been shipped in carefully protected barrels.

Coal output of different states by counties, and a directory of mines is the information conveyed in a neat blue book entitled "Coal Statistics, 1894." The figures given are up to 1893, and the book will no doubt be valuable on account of the directory. It can be had for 50 cents from Alder & Ruley, Philadelphia, Pa.

The schooner Lem Ellsworth was sold by W. T. Farwell to Mrs. F. A. Baker, Detroit, for \$2,500. A year ago she was rated at \$6,000. This is an evidence of depreciation in a class of vessel property that will be exterminated in a few years. It was the class, however, that paid for themselves in a few seasons. Another instance is the barge Brooklyn. Last year she was rated at \$2,000, and this spring sold for \$1,700, and is now for sale for \$800.

The following is from the Coast Seaman's Journal of San Francisco: "The MARINE REVIEW of June 30 is a beautiful double number containing a full description of the new lake steamer North West and supplemented by a number of fine photo-engravings. The REVIEW stands well in front in maritime journalism. Besides being up to date and way ahead in nautical affairs, it is generally fair in its views, which is the quality rarest and best in all the field of newspaper work."

In the Century for July Albert Franklin Matthews describes the "Evolution of a Battleship" in an illustrated article, in which he traces it from its first conception in the brain of Lieut. Lewis Nixon, now superintending constructor in the Cramps' yard, to its final transfer from the waters of the Delaware to the high seas. In the same number of the Century Lieut.-Comdr. J. D. Jerrold Kelley, U. S. N., has an article on the "Superstitions of the Sea."

A steamer designed for towing coal barges on the Atlantic coast in the vicinity of Boston was launched recently from the ship yard of John Dialogue & Sons, Camden, N. J. The boat is named Nottingham and is being built for the New Jersey Central Railroad Company. Both hull and houses are of steel, and she is 128 feet 6 inches keel, 150 feet over all, 27 feet 4 inches beam and 17 feet 3 inches depth. The engines are triple expansion, with cylinders 16, 24 and 41 inches diameter and 30 inches stroke of piston.

John H. Macalpine and H. C. Flood are the authors of a series of articles on "The Vibrations of Steamships," now being printed in Engineering of London. Mr. H. C. Flood is engaged in the designing of marine engines with the Dry Dock Engine Works of Detroit, and his predecessor in the same position was a Mr. Macalpine, but we have heard no announcement in local marine circles of the gentlemen having written the articles which are evidently regarded as of high character by the London publication.

Part 12 of the "Book of the Fair" is at hand. It is fully up to the standard, if not better than some of the preceding numbers, and the standard of the work, so far, is as high as can be attained. The 102 square inch full page plates are beautiful examples of light and shade and bring out the white city in all its detail. The point of view is well selected. No one who wants a history of the fair and something handsomely artistic to adorn their library should miss seeing this work. It is published in 25 parts by the Bancroft Company, Auditorium, Chicago, at \$1 a part.

From Industry, San Francisco.—"The MARINE REVIEW, Cleveland, O., has, with commendable enterprise, published a double number for June 30, containing, besides a large number of engraved drawings of the great passenger steamer North West, fourteen pages of finely executed photo plates illustrating that vessel. The North West is well worth the expense incurred in the present case to show the public what she really is. The appointments throughout in all departments, of the highest class known to modern skill and art, are marvelous indeed, and quite beyond any description possible here. Those interested in ships and ship building should not fail to procure a copy of the MARINE REVIEW for the date given. The price is 50 cents.

\$3.00 to Niagara Falls, August 20, via the Nickel Plate road, 10 p. m. Chautauqua Lake free. Toronto \$1.00 extra. Thousand Islands \$9.00. Cleveland offices, 224 Bank street, 534 Pearl street, and depots. 16

The Bersier Steering Compass.

Short notes regarding the steering compass invented by Lieut. Bersier of the French navy, by means of which it is proposed to dispense with the man at the wheel and secure great precision in steering, have appeared in marine publications of late. *La Nature*, one of the leading French scientific journals, describes the instrument and its operation, and from a translation prepared for the *Scientific American* some extracts are made here, simply on account of the attractive features of the problem of the automatic steering of ships.

"The difficulty in the way of this problem," says *La Nature*, "has been the necessity of giving the very delicate and sensitive rose of the new compasses its full liberty, while at the same time utilizing the elementary rotations of the sides of its box with respect to the rose, that is to say, the lurches of the ship, in order to correct such lurches by means of the rudder. In order to govern this part, then, it was impossible to think of utilizing the steering power of the rose; in a word the latter could not be touched. It is this that explains the want of success of all the tentatives made up to the present to devise warning compasses, that is to say, compasses to signal the deviations of a ship to a distance. In such instruments, a magnetized needle was flanked by two stops forming electric contacts against which it struck, in becoming disturbed, however, in most cases. As our readers well know, a mariners' compass consists of a glass-covered cylindrical box suspended in gimbals in what is called a binnacle. At the center of the bottom of the box rises a rod that carries an iridium pivot. A light paper disk slit upon an aluminum circle carries eight parallel magnetized needles. Such is the card or rose, which weighs 375

pounds (Fig. 3). The box of this compass has been under trial for two months in a squadron and the experiments have proved a perfect success. The absolute indifference of the rose to the electric spark was particularly exhibited, and it was found possible, as the report of the trials proves, to steer within a fraction of a degree or thereabout. Such indifference of the rose evidently results, in the first place, from the fact that the induced current employed has an intimate intensity—it is alternating. Moreover, certain precautions are taken as regards the leaping of the spark. The coil and the electros are at a distance from the compass. Experience shows that it is sufficient for them to be at a distance of five yards therefrom in order to obtain the best result. Thus the induced circuit of high tension, and consequently of relatively difficult insulation, is not ten yards in length. The number of the coil is so selected as to prevent all accidental losses. Lieut. Bersier has patented this new instrument under the name of registering governer. When the apparatus acts as a register, the box is higher and its sides are covered with a band of paper which receives from a clock work mechanism an ascensional movement of three inches in four hours, a length of time that constitutes the duration of one point (Fig. 2). The electric spark pierces this paper in its travel from the north point of the rose to the plates. The result is that every lurch of the vessel, however short be the duration of it, is registered. Thus responsibility can be clearly established in the case of a collision. Finally, the box of the steering compass, provided with six plates, for example, instead of two, each being connected with a distinct Geissler tube placed in front of the man at the wheel, serves, under the name of automatic transmitter of course orders, to steer by hand from any point what-

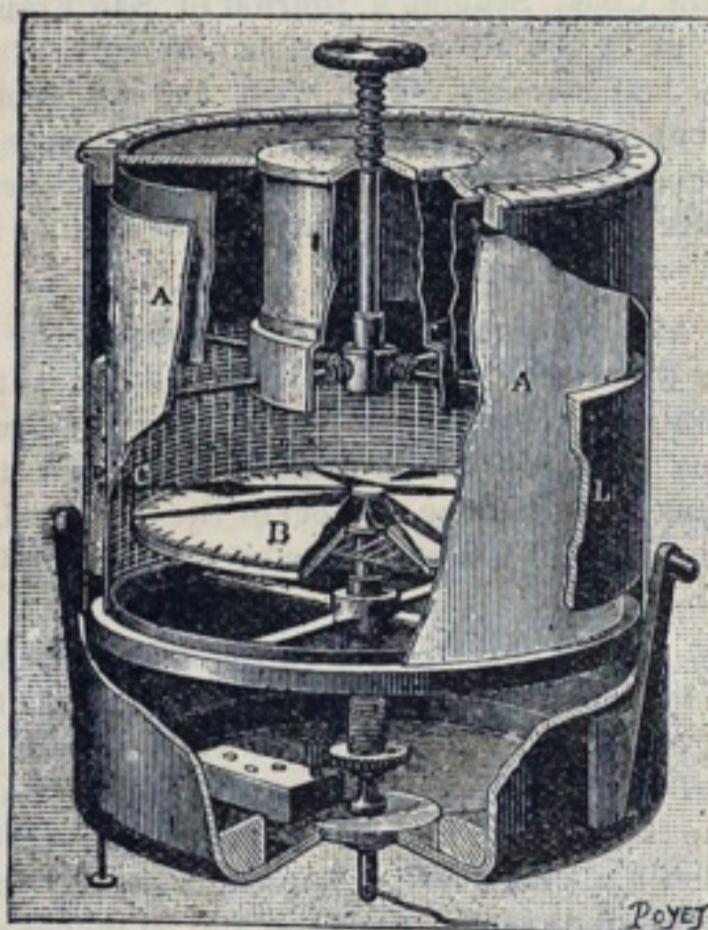


FIG. 1—STEERING COMPASS.

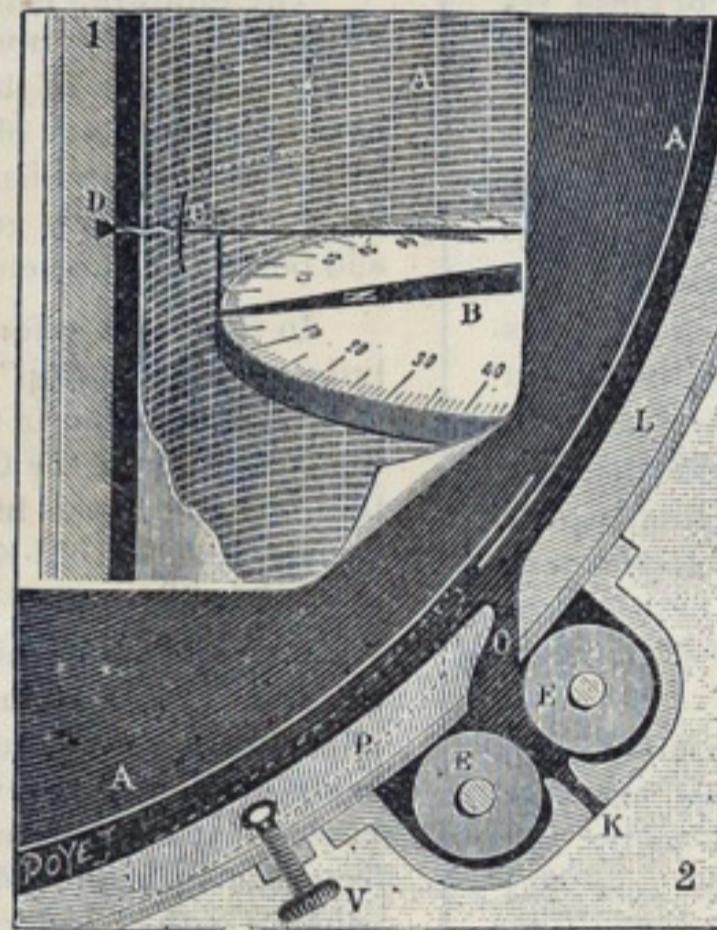


FIG. 2—SHOWING DETAILS.

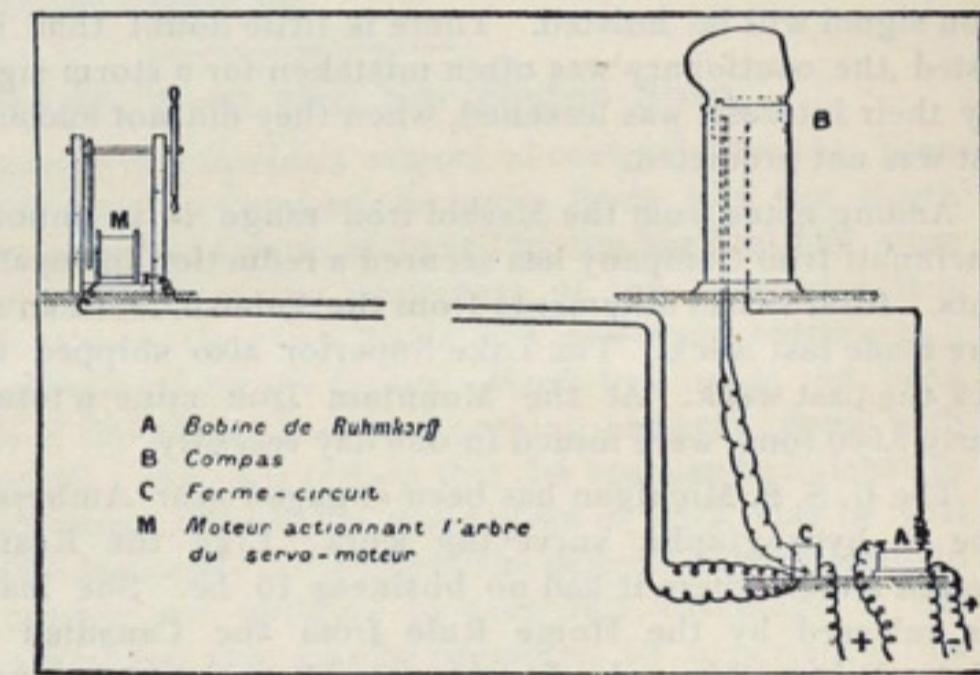


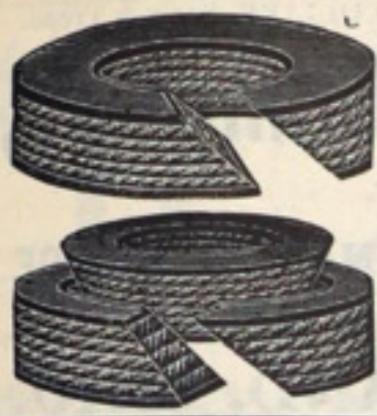
FIG. 3—INSTALLATION AND STEERER.

grains, at the most, in the large models. Its circumference is graduated in degree from 0 to 90 in each quadrant, starting from the north and west points, on the one hand, up to the east and west points on the other. At its center there is a sapphire which rests upon the point of the pivot. The position of the needles below the disk, to which they are attached by silk threads, assures the horizontality of the rose.

"Lieutenant Bersier, as long ago as the year 1888, thought of employing the electric spark of the Ruhmkorff coil to unite a point of the circumference of the rose and two semicircular plates insulated electrically from each other and the sides of the box that they covered. Some studies successively carried on upon a torpedo boat and a large cruiser were arrested at this epoch by the absence of electric wiring upon many ships. The operation of the coil, in fact, can be practically assured only by a small derivation from a dynamo to the exclusion of electric batteries. Things are now much changed. Upon all modern ships, a few amperes are as easily taken from a general circuit conductor as water is from a cock. So the steering compass will be henceforth easy to install. It operates as follows: In a room located at a few yards distance from the best compass on board is placed a Ruhmkorff coil supplied by a mean current of from two to three amperes. The induced current of this coil, through a flexible wire, reaches the pivot of the compass, whence it jumps to the aluminum capsule that carries the sapphire, and follows an aluminum wire, forming a radius of the north pole of the rose Fig. 1. According as the ship is to the right or left of its course, the current leaps in a spark of about an inch from the north point to the right hand or left hand plate of the box and flows, at a few yards therefrom, into one or the other of two electro-magnets, which close the circuit of a small 150 watts motor, in order to cause it to revolve to the left or right. The shaft of this motor is keyed upon that of the rudder motor. One merely replaces here the muscular strength of the pilot without in anywise changing the already existing parts of the ship. This installation is therefore simple and inex-

pensive (Fig. 3). The box of this compass has been under trial for two months in a squadron and the experiments have proved a perfect success. The absolute indifference of the rose to the electric spark was particularly exhibited, and it was found possible, as the report of the trials proves, to steer within a fraction of a degree or thereabout. Such indifference of the rose evidently results, in the first place, from the fact that the induced current employed has an intimate intensity—it is alternating. Moreover, certain precautions are taken as regards the leaping of the spark. The coil and the electros are at a distance from the compass. Experience shows that it is sufficient for them to be at a distance of five yards therefrom in order to obtain the best result. Thus the induced circuit of high tension, and consequently of relatively difficult insulation, is not ten yards in length. The number of the coil is so selected as to prevent all accidental losses. Lieut. Bersier has patented this new instrument under the name of registering governer. When the apparatus acts as a register, the box is higher and its sides are covered with a band of paper which receives from a clock work mechanism an ascensional movement of three inches in four hours, a length of time that constitutes the duration of one point (Fig. 2). The electric spark pierces this paper in its travel from the north point of the rose to the plates. The result is that every lurch of the vessel, however short be the duration of it, is registered. Thus responsibility can be clearly established in the case of a collision. Finally, the box of the steering compass, provided with six plates, for example, instead of two, each being connected with a distinct Geissler tube placed in front of the man at the wheel, serves, under the name of automatic transmitter of course orders, to steer by hand from any point what-

ever of the ship with a compass placed no matter where. It is this instrument that has been tried in a squadron, and two new specimens of which are now in course of construction for our navy by Mr. Postel Vanay. The solution of this problem was very necessary, since, upon our new ships, the binnacle compass, always placed near masses of iron, possesses no sensitiveness, but 'sleeps,' according to the technical expression. A method of steering with the standard compass placed under the best conditions possible became necessary, and it became necessary, too, to find a means of sending its indications to a distance. Experience has proved that six or eight of these indications are more than adequate to permit of affecting all the changes of route and of steering with a precision hitherto unknown. With this instrument a simple revolution of the cover of the compass by hand, carrying along the plates with it, is immediately followed by an identical rotation of the ship. The edge of this cover, moreover, is graduated like the rose itself, and, in order to hold any route whatever, N. 25-E., for example, it suffices to place in the axis of the vessel, opposite an appropriate index, the division 25, comprised between the north and east of the cover. The pilot then takes the new route without even being aware of the fact, in thinking that he is correcting a lurch. The straight route or zero indication can be transmitted to him only when there is an absolute superposition of the graduation of the cover and of that of the rose. The spark then leaps both to the first plate to the right and the first to the left. The slightest lurch has the effect of making it leap to only one of them. The entire precision of the apparatus rests upon the sensitiveness of this zero signal. Great precision, and consequently, security and economy are the main advantages that large steamers will derive from the apparatus. At present, steering is done within about one or two degrees, that is to say, with a lateral deviation of 12 twelve miles for a day of 480 miles steaming. With this apparatus the lateral deviation would be annulled, as the steering is done within a fraction of a degree.



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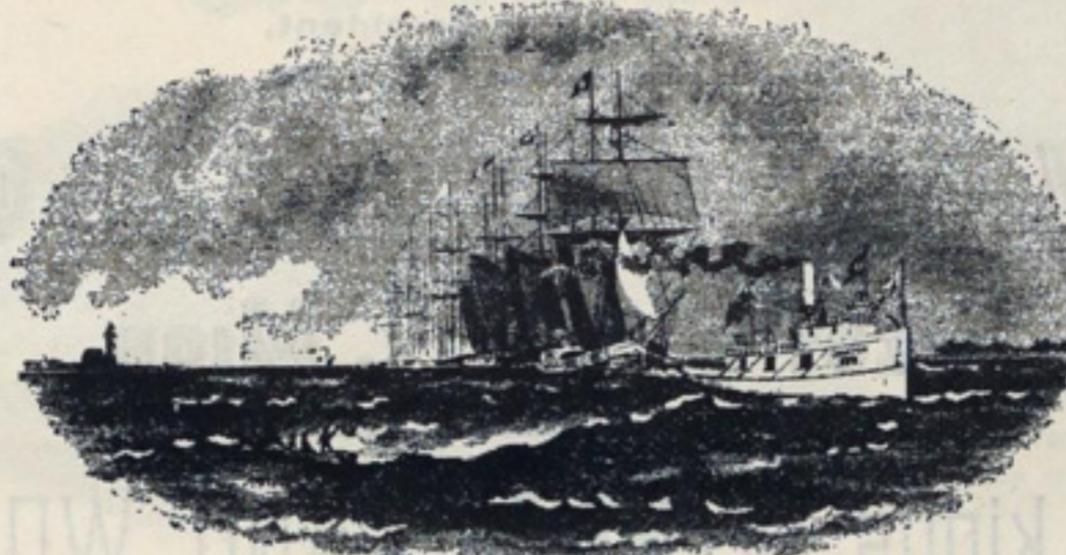


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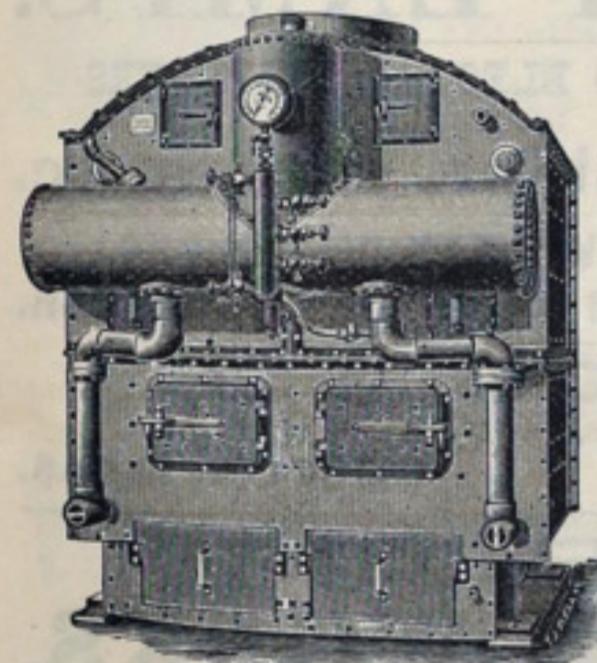
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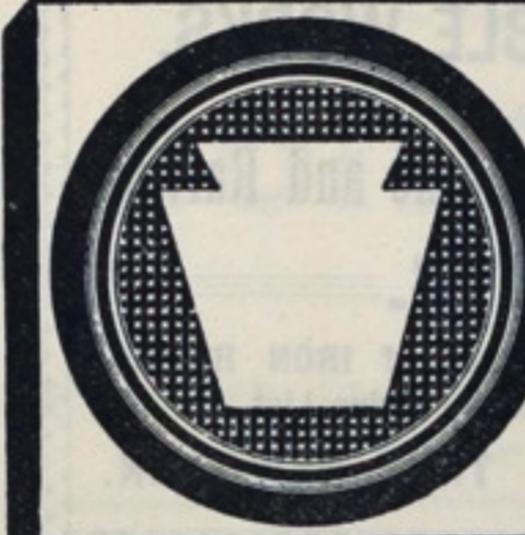


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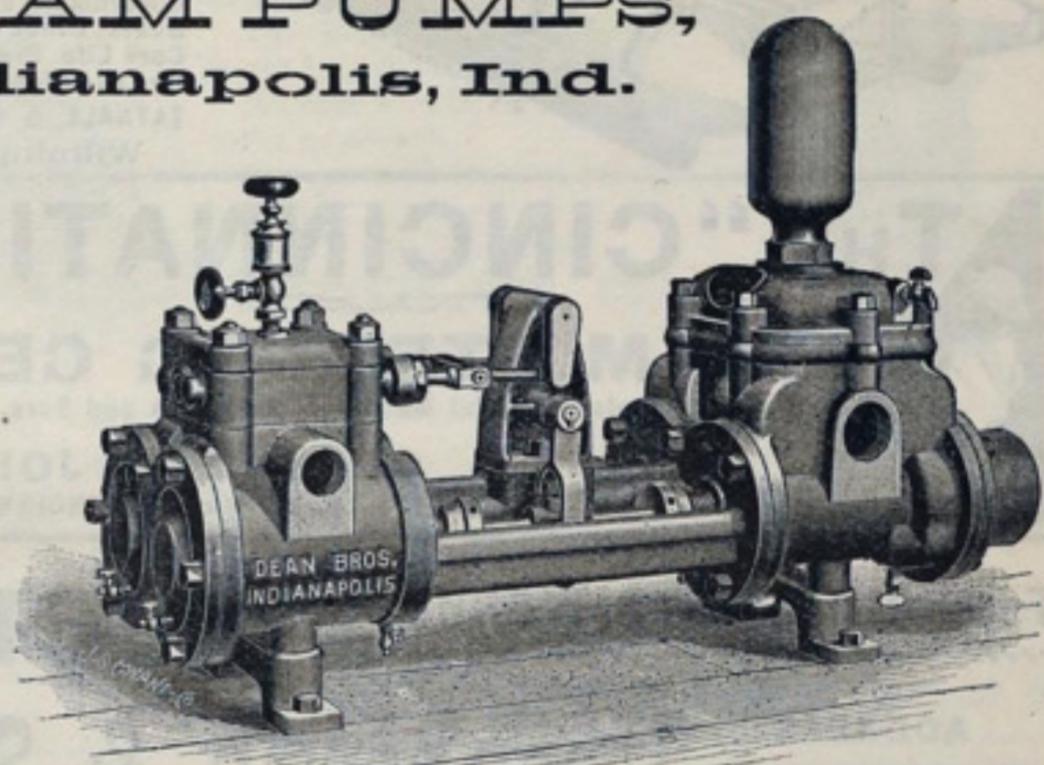
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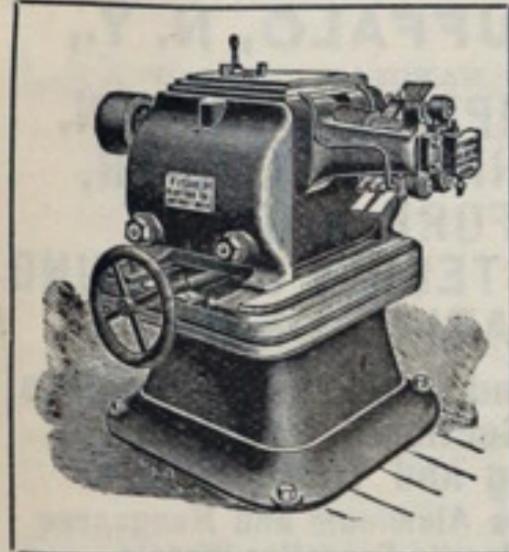
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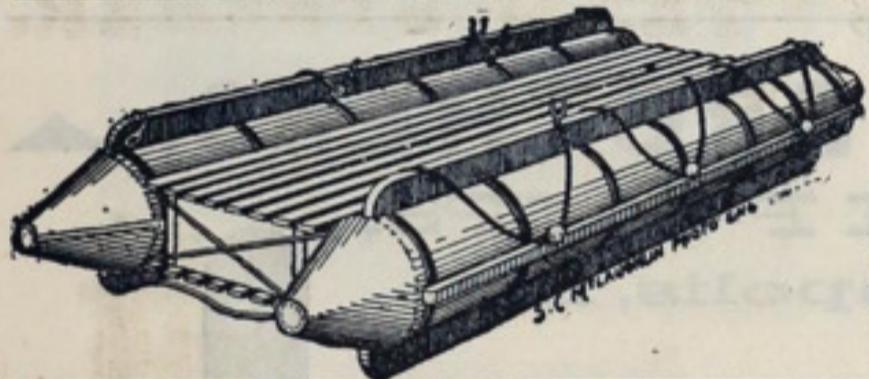
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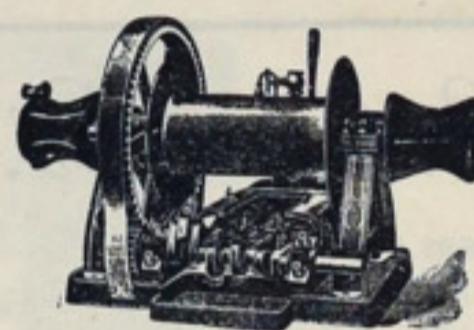
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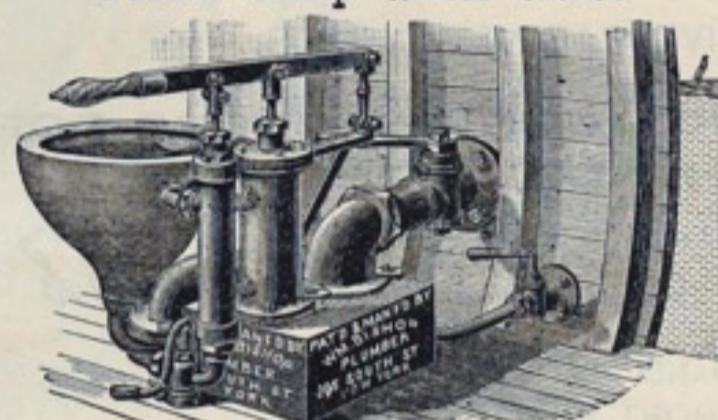
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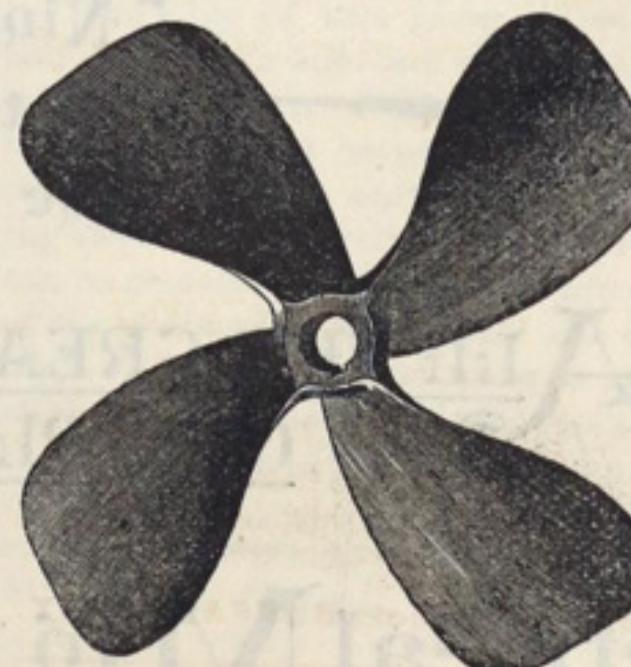
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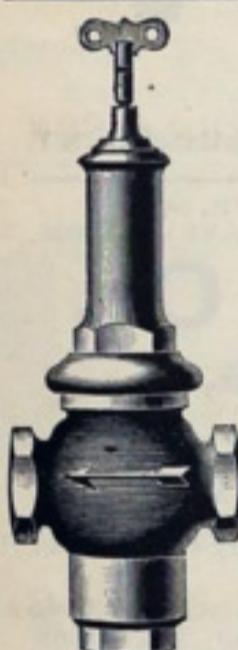


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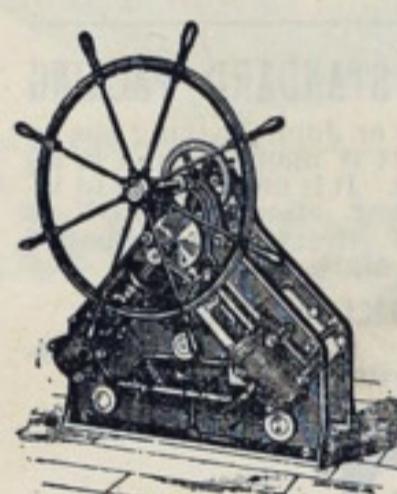
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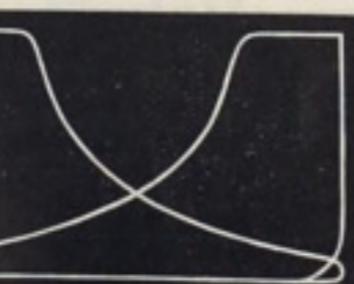
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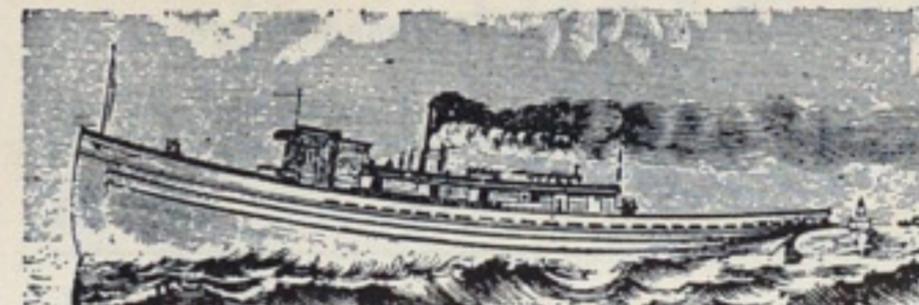


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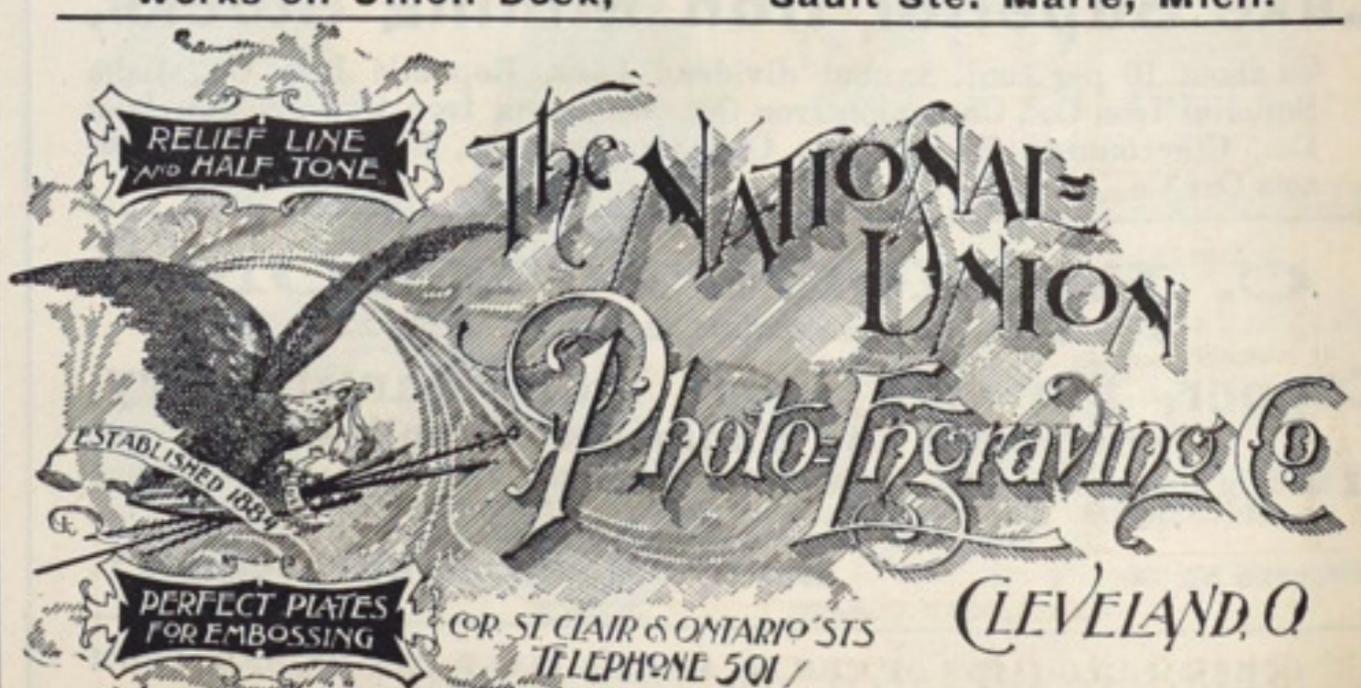
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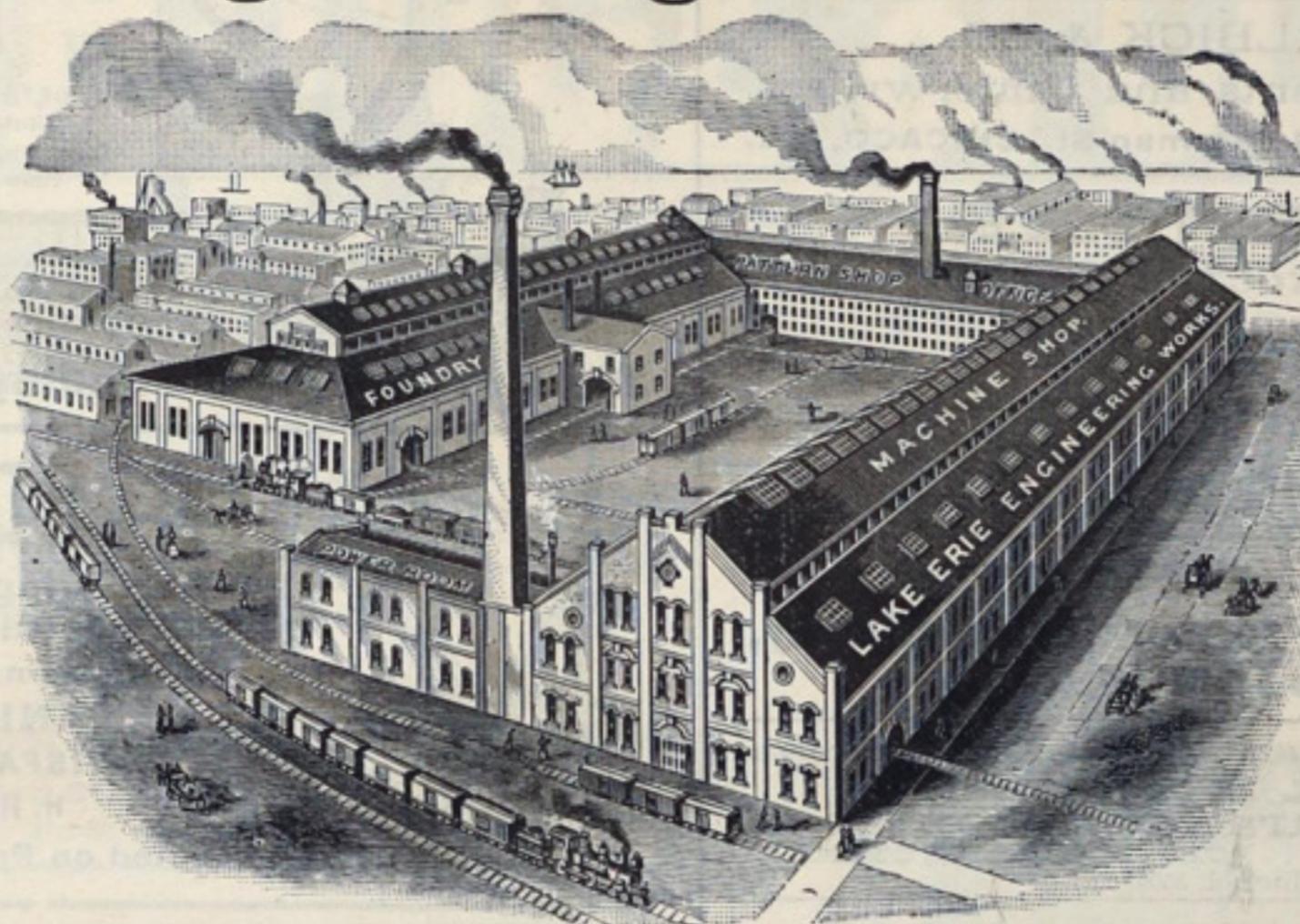


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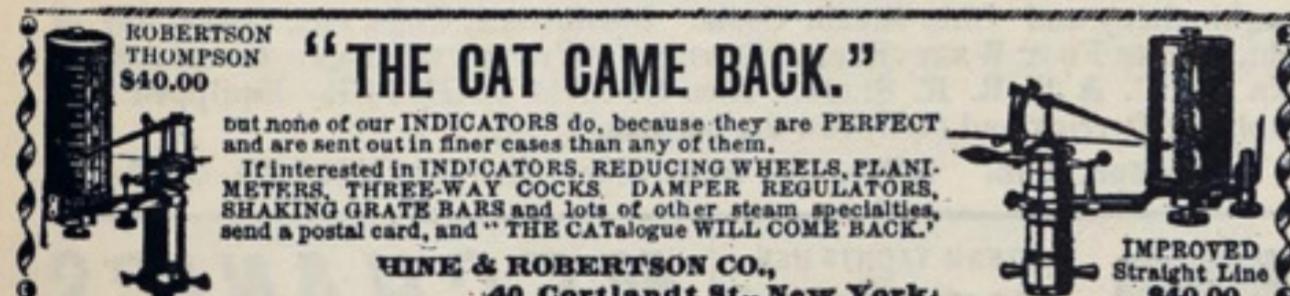
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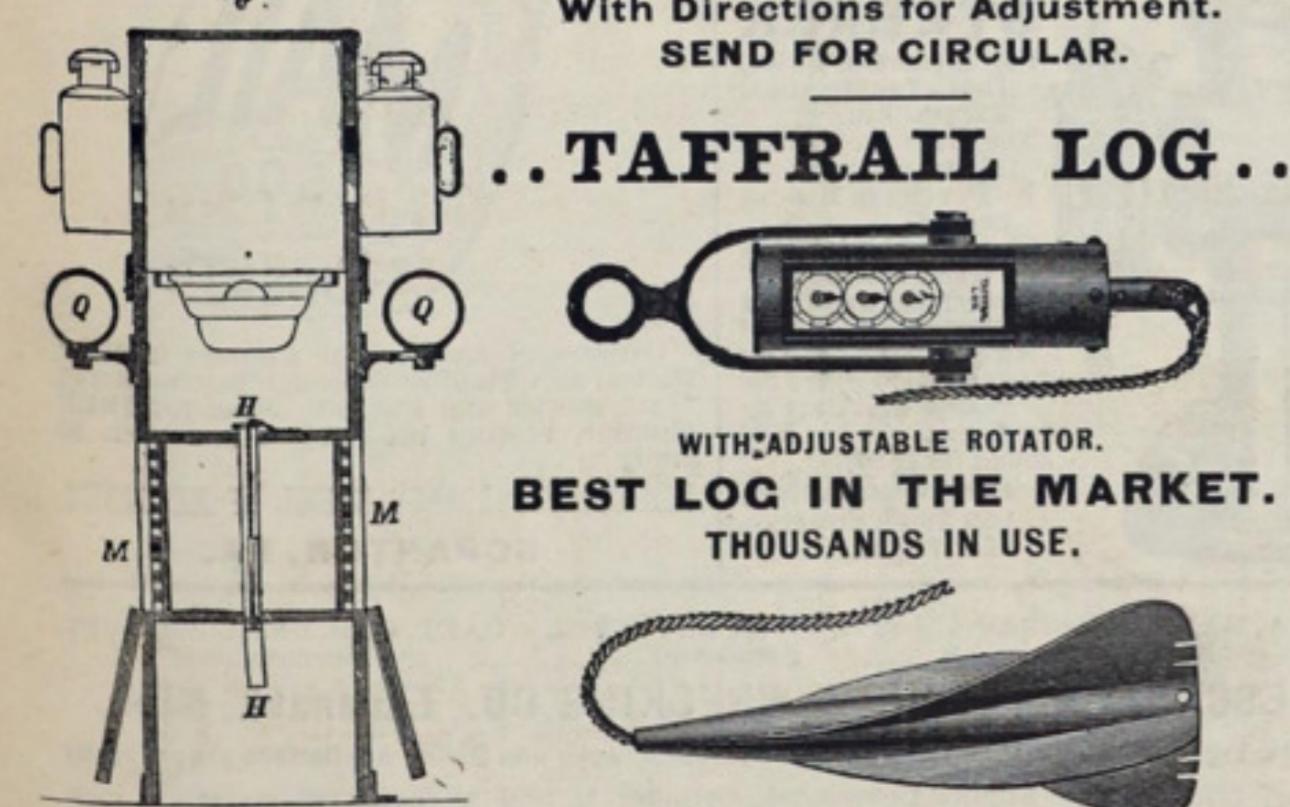
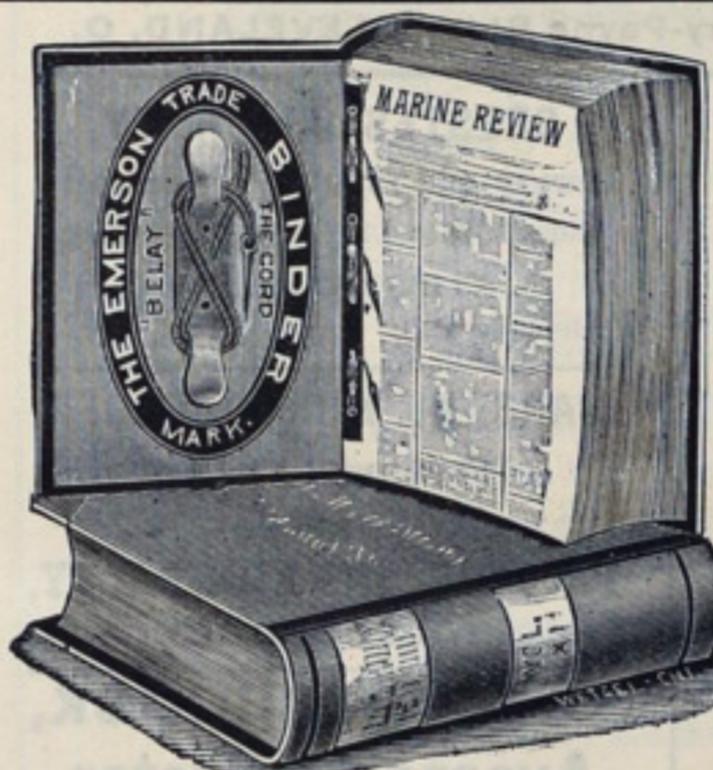
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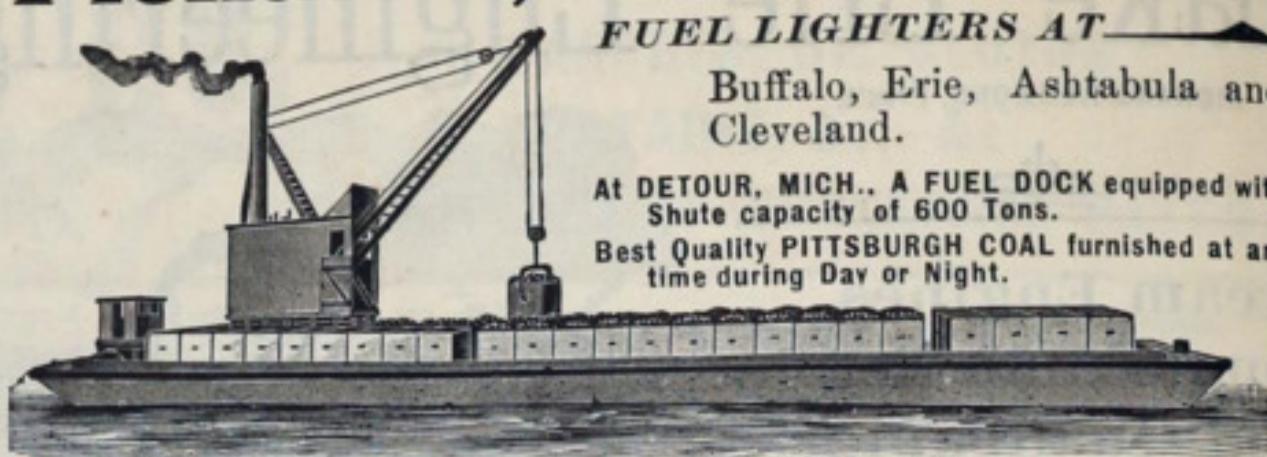
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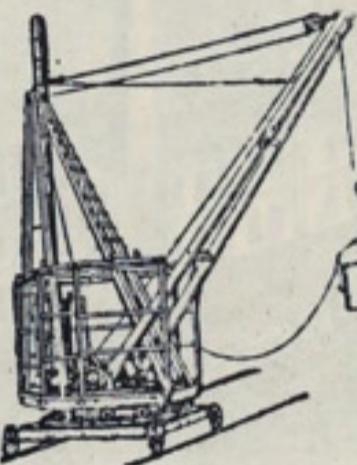
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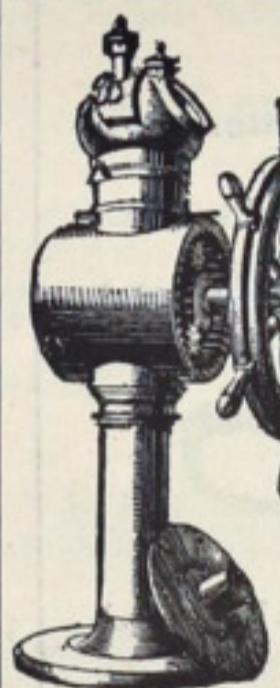
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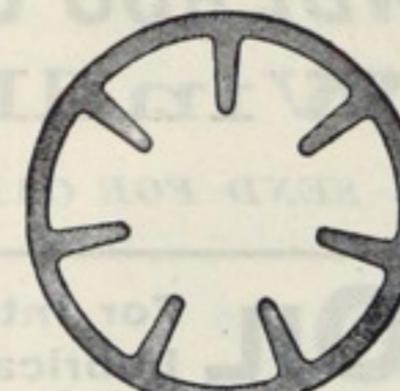
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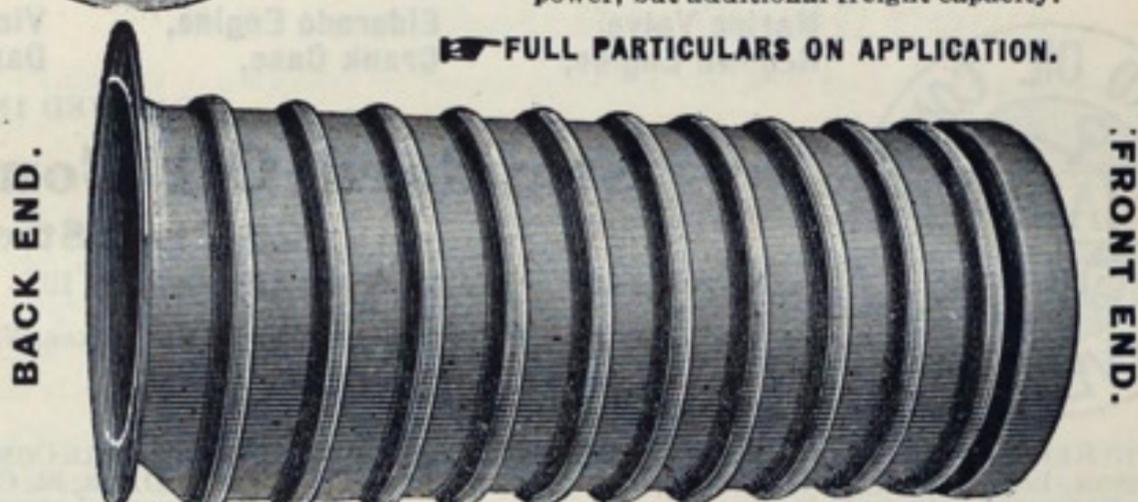
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